

A PRELIMINARY REVIEW OF THE PROMINENTLY PAPILLOSE *HUERNIA* SPECIES (ASCLEPIADACEAE)

L. C. LEACH*

ABSTRACT

19 species of *Huernia*, characterised by their prominently papillose corollas, are reviewed and their apparent affinities, diagnostic characters, variation and distribution discussed in detail; attention is also given to synonymy and nomenclatural matters. Maps showing the known distribution of the species are provided, as well as an artificial key to the taxa now recognised. One new variety is described and *H. nigeriana* is re-instated at specific level.

UITTREKSEL

'N VOORLOPIGE HERSIENING VAN DIE PROMINENTE PAPILOORTREKTE
HUERNIA SOORTE (ASCLEPIADACEAE)

Negentien *Huernia* soorte, gekenmerk deur 'n papiloortrekte blomkroon, word hersien en hulle skynbare verwantskappe, onderskeidende kenmerke, variasie en verspreiding word in besonderhede beskryf; aandag word ook aan die sinonieme en nomenklatoriese sake gegee. Kaarte wat die bekende verspreiding van die soort toon, word aangegee, asook 'n kunsmatige sleutel tot die taksa wat nou erken word. Een nuwe variëteit word beskryf en *H. nigeriana* word weer as 'n soort erken.

INTRODUCTION

The species of *Huernia* distinguished by prominently papillose corollas appear to form a related group, although it seems possible that several phyletic lines may be involved, with convergence accounting for some of the similarities. On the other hand there seems a distinct possibility that there may once have been a more continuous distribution pattern. Evidence of this may well exist today but remain undiscovered, as the area lying between the northern and central groupings has been far from intensively botanised; furthermore, examples from other groups of the genus are by no means absent from this area. Among these are *H. aspera* N.E.Br., now known from as far south as Liwonde in Malawi, and *H. verekeri* Stent, until recently thought to be of relatively restricted distribution, from Zambia and Malawi as well as westward almost to the Atlantic coast, while very recently the rare *H. leachii* Lavr. from central Mozambique has been found near Lake Malawi.

Among the distinguishable subdivisions of the group, the *H. hystrix-stapeloides-volkartii* complex appears to form one series while the northerly based

* Hon. Botanist, National Herbarium, Salisbury, Rhodesia.

Accepted for publication 6th July, 1976.

species (including *H. nigeriana*) may represent another. The possible evolutionary background of the geographically more centrally situated species, including *H. kirkii*, *H. hislopilii*, *H. levyi*, etc., appears to be rather more obscure, although there seems little doubt that the species involved are quite closely related.

The decision, based on morphological characters, to retain *H. volkartii* at specific level and to reinstate *H. nigeriana* is supported by the available cytological evidence, as well as providing a phytogeographically somewhat more acceptable solution for the affinities involved. Both varieties of *H. volkartii* are tetraploid while *H. nigeriana* is diploid, as are both *H. hystrix* and *H. stapelioides*.

The southernmost group, with quite different, multi-angular stems (*H. kenne-dyana*, *H. longii*, *H. pillansii* and the possibly hybrid *H. distincta*), appears to belong in a rather more divergent, albeit closely related, line of development.

In this article reference is made to the corona and its inner and outer lobes rather than to the inner and outer coronas, as the implication that there are two separate coronas is considered to be most misleading. Similarly, it is not always clear, in descriptions, exactly what is meant by the length of the inner lobes. Where given in the following text this is as indicated in the accompanying sketch, which also shows a typically "huernia" arrangement of the anther wings and nectarial orifice (or stigmatic cavity) with a small tubercle at its base. Although the function of the tubercle (usually present, although varying considerably in size and prominence, in *Huernia* but apparently absent from *Duvalia*) is obscure there does seem to be a measure of correlation between the length of the caudicles connecting the pollinia to the translator (generally short in *Huernia* and long in *Duvalia*) and the distance between the base of the anther wings and the nectarial orifice. This seems possibly to indicate that the orifice and cavity may provide an alternative path for the pollen-tubes additional to that described by the late Dr. Reese (1973), and that the term "stigmatic cavity" may thus be correct in its implication. This orifice is herein referred to as "nectarial" as it appears to be, in at least some species, the source of the "nectar" (attractant would perhaps be a more suitable term) which appears to be the origin of the mostly foetid odours emitted by most members of the tribe. However, whatever the precise function of this cavity (and in *Huernia* its attendant tubercle), it seems that much remains to be learnt concerning the pollination of these interesting plants.

Characters more or less common to the group include:

Stems: glabrous, estipulate, variably tuberculate-dentate.

Inflorescence: flowers developed singly, successively, usually from near the base of the stems.

Bracts: subulate.

Corolla: limb and lobes and within the mouth of the tube, more or less densely covered with prominent fleshy papillae, which are longest around the mouth of the

tube opposite the intermediate lobes and progressively reduced in size towards the apex and margins of the lobes.

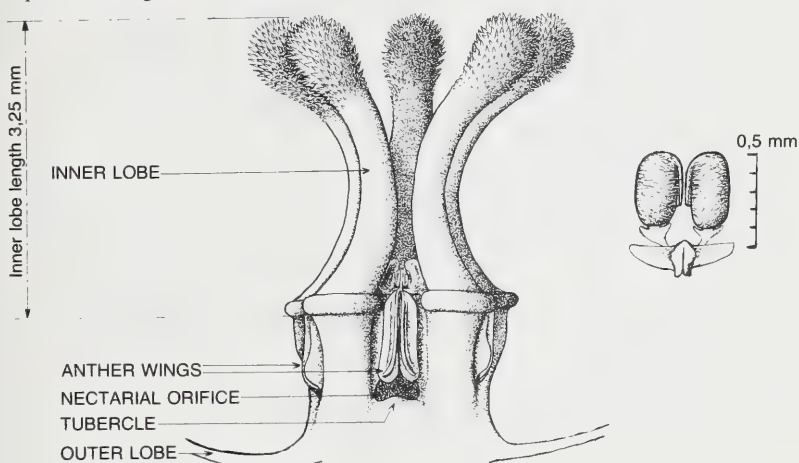


FIG. 1.

Characteristic "huernia" corona (*H. longituba* subsp. *longituba*, N of Kanye, Botswana, Leach et al. 12469).

Corona: more or less as illustrated above, sessile, with the outer lobes closely adpressed to the base of the tube, mostly so variably shaped as to be diagnostically valueless; inner lobes are of two forms, both enlarged often transversely gibbous at the base, and (1) clavate or appendaged at the apex and (2) those usually referred to as "subulate" (i.e. tapering to a small, obtuse apex); the former, although very variable, are usually identifiable with a given taxon.

Pollinia: more or less elliptic or oblong-elliptic, attached to the translator by short translucent caudicles which are often laterally much expanded just below the point of attachment to the pollinium. The shape of the pollinia and the length of the caudicles appear to be more or less constant for the genus. Although there seems a slight possibility that pollinium size may be to some extent of taxonomic significance it seems more probable that it may prove merely to be a factor of flower size.

Other characters which are more diagnostic are dealt with under the individual taxa.

A list of the species discussed:

- | | |
|---------------------------|-------------------------|
| 1. <i>H. hystrix</i> | 4. <i>H. volkartii</i> |
| 2. <i>H. stapelioides</i> | 5. <i>H. nigeriana</i> |
| 3. <i>H. loesenerana</i> | 6. <i>H. lodarensis</i> |

- | | |
|------------------------------|--------------------------|
| 7. <i>H. erinacea</i> | 14. <i>H. kirkii</i> |
| 8. <i>H. recondita</i> | 15. <i>H. longituba</i> |
| 9. <i>H. boleana</i> | 16. <i>H. kennedyana</i> |
| 10. <i>H. whitesloaneana</i> | 17. <i>H. pillansii</i> |
| 11. <i>H. occulta</i> | 18. <i>H. longii</i> |
| 12. <i>H. hislopilii</i> | 19. <i>H. distincta</i> |
| 13. <i>H. levyi</i> | |

The line drawings accompanying the specific descriptions depict characteristic inner corona-lobes and examples of the largest papillae from the throat and around the mouth of the corolla tube (mostly in both front and side view); these are generally specifically diagnostic and may be used pictorially to "key-out" specimens.

Identification of the taxa is often possible from examination of only one or other of these illustrated features, while their various combinations are almost always conclusively diagnostic despite the extent of their variability. In the few instances where doubt may arise it will be found that the stem and/or corolla characters provide adequate additional evidence of identity, e.g. *H. erinacea* vs. *H. loda-rensis* or the subspecies of *H. pillansii*.

The species dealt with are on the whole very well differentiated and it is considered that identification of live or "spirit" material should present no problem; however, as some characters are difficult to interpret in dry specimens, the correct placing of these is often more difficult. With this in mind, supplementary and confirmatory characters have been included wherever possible in the following key.

AN ARTIFICIAL KEY TO THE TAXA

1. *Inner corona-lobes* clavate, ventricose-clavate, truncate-clavate, sharply expanded and somewhat foot-like at the apex, or rarely stoutly obtuse and very slightly subclavate 2
- *Inner corona-lobes* subulate, obtuse, scarcely acute at the apex, sometimes very slightly enlarged, very rarely more or less cylindric 15
2. *Inner corona-lobes* glabrous (or virtually so), $\pm$ flat on the truncate apex; *tube* shallow $\pm$ half as long as wide, often sparingly asperulate inside; *corolla-lobes* $\pm$ deltate; *papillae* subulate, flattened; stems 5-angled 3
- *Inner corona-lobes* minutely papillose, clavate, ventricose-clavate, inverted foot-like, or rarely stoutly obtuse, subcylindric sometimes slightly subclavate 4
3. (2) *Corolla* 30–50 mm diam.; *papillae* up to 5 mm long; *pedicel* 20–50 mm long; *inner corona-lobes* usually distinctly foot-like or occasionally $\pm$ hoof-like 1a ***hystrix* var. *hystrix***
- *Corolla* 20–30 mm diam.; *papillae* up to 3 mm long; *pedicel* 12–32 mm long; *inner corona-lobes* truncate, $\pm$ hoof-like, usually micro-puberulous, often pustulate 1b ***hystrix* var. *parvula***
4. (2) *Corolla-lobes* $\pm$ deltate, often wider than long 5
- *Corolla-lobes* deltate-acuminate or $\pm$ narrowly triangular, longer than wide 12

5. *Inner corona-lobes* at least 2.5 mm long6
- *Inner corona-lobes* not more than 2 mm long; *papillae* conical, obtuse, short; *stems* 4-angled; tube sparingly asperulous inside towards the base; *corolla* $\pm$ tubular with sub-erect or sub-erectly spreading lobes3 **loesenerana**
6. *Tube* wholly dark purple within, sometimes obscurely somewhat palely banded7
- *Tube* distinctly concentrically lined within, red on whitish9
7. *Corolla* tubular or tubular-campanulate; *inner corona-lobes* sub-cylindric, or stoutly obtuse and sometimes slightly subclavate8
- *Corolla* bicampanulate; *papillae* unicoloured blackish maroon, elongated conical, up to 2 mm high; *inner corona-lobes* clavate; *stems* 4/5-angled14 **kirkii**
8. *Papillae* elongated conical, bearing long setae, sometimes longer than the *papillae*; *corolla* tubular, scabrous outside, with a raised densely minutely papillose annulus inside shortly above the base; *stems* 4/5-angled13 **levyi**
- *Papillae* stout, obtuse, without long setae; tube slightly constricted above the ampliate base with the throat at least as long as the ampliate portion; *corolla-lobes* widely spreading, often slightly acuminate; *stems* 5/7-angled12b **hislopii** subsp. **robusta**
9. (6) *Tube* shallow, $\pm$ half as long as wide; *papillae* subulate, flattened; *inner corona-lobes* clavate, ventricose-clavate, occasionally $\pm$ cylindric obtuse, rarely inverted foot-like, minutely papillose; *stems* 5-angled10
- *Tube* at least as long as wide; *papillae* elongated conical; *inner corona-lobes* clavate or sometimes $\pm$ cylindric obtuse; *stems* 4/6-angled11
10. *Stems* erect or shortly decumbent erect, usually prominently toothed and angled4a **volkartii** var. **volkartii**
- *Stems* trailing with somewhat obsolescent tubercles and rounded angles4b **volkartii** var. **repens**
11. (9) *Papillae* with acute stout setae, often as long as the *papillae*; *inner corona-lobes* clavate, sub-clavate or sometimes $\pm$ cylindric obtuse; *corolla* often slightly ampliate at the base; *stems* 5/6-angled15b **longituba** subsp. **cashelensis**
- *Papillae* without setae, *inner corona-lobes* clavate, *corolla* not ampliate at the base; *stems* 4/5-angled15a **longituba** subsp. **longituba**
12. (4) *Stems* 4/7-angled; *corolla-lobes* deltate-acuminate, *inner corona-lobes* $\pm$ 3 mm long or more13
- *Stems* with more than 7 angles; *corolla-lobes* $\pm$ narrowly triangular; *inner corona-lobes* $\pm$ 2 mm long, usually rather knob-like at the apex14
13. *Tube* distinctly concentrically lined within (red on whitish), shallow, $\pm$ half as long as wide; *inner corona-lobes* usually inverted foot-like, rather bristly papillose; *stems* usually 4-angled, very rarely 5-angled2 **stapelioides**
- *Tube* wholly dark purple within (sometimes obscurely palely banded), at least as long as wide; *inner corona-lobes* stout, obtuse, rarely slightly sub-clavate, never at all foot-like; *stems* 5/7-angled12b **hislopii** subsp. **robusta**
14. (12) *Stems* with 14–20 vertical or spiral rows of tubercles, each tipped with a long soft bristle17a **pillansii** subsp. **pillansii**
- *Stems* with 8–9 $\pm$ obtuse, $\pm$ tessellate, glabrous angles17b **pillansii** subsp. **echidnopsioides**
15. (1) *Inner corona-lobes* subulate, rarely slightly enlarged at the minutely obtuse apex or $\pm$ cylindric obtuse, minutely papillose or tuberculate-scabrous16
- *Inner corona-lobes* subulate, smooth at the subacute apex, 4 mm long; *corolla* smooth outside, minutely spotted within9 **boleana**

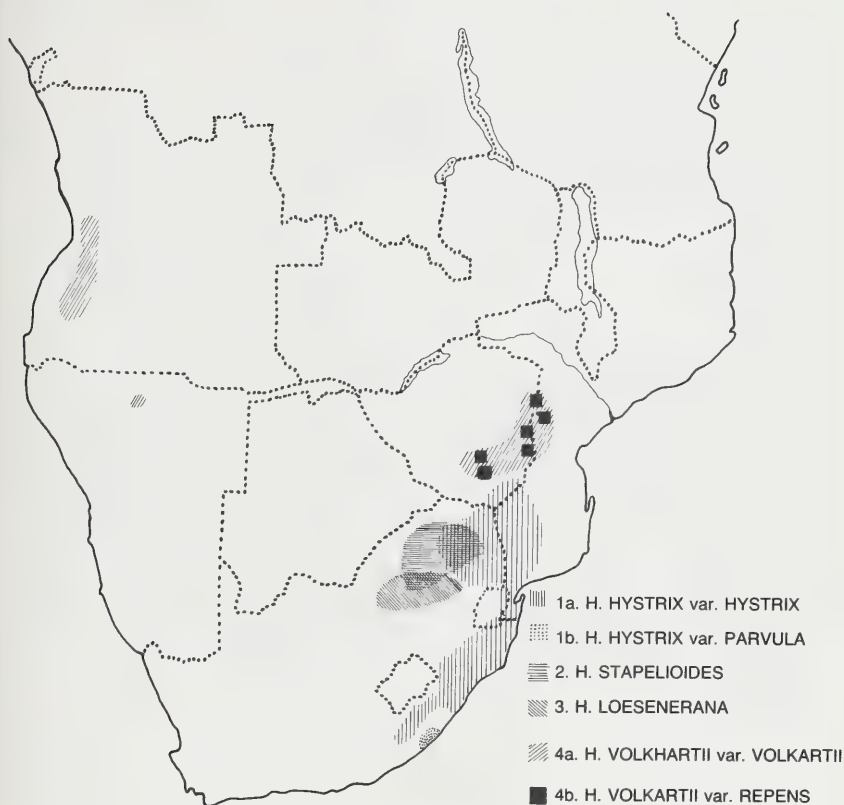


FIG. 2.
Approximate areas of distribution of species of Group I.

somewhat doubtfully distinguished from the contiguously distributed *H. stapelioides*.

It seems probable that the extremely variable *H. hystrix* may be ancestral to this group and that differentiation has occurred more or less on the periphery of its distribution, with somewhat similar combinations of characters emerging at different points. For example: plants of var. *parvula* from the Port Shepstone area, and others from the northern Transkei appear to exhibit a rather closer affinity with *H. stapelioides* and *H. volkhartii* than do most more typical specimens of *H. hystrix*.

The species of this group, although very variable in some of their characters, are sufficiently constant in others to be readily identifiable and are, in addition,

separated to a very large extent both ecologically and altitudinally, and in the tetraploid *H. volkartii* by its disjunct distribution also.

H. hystrix occupies low altitude areas, generally below 750 m, while *H. stapelioides* occurs at middle altitudes up to $\pm$ 1 500 m and *H. loesenerana* at about 1 250 m and above. There is some merging, in the Transvaal, of the distributions of *H. hystrix* and *H. stapelioides* at their respective upper and lower altitudinal levels, and it seems possible that the occasionally spiny and very rarely 5-angled stems of some specimens of *H. stapelioides* may be due to hybridisation, although there seems little or no evidence of this in floral characters. The distribution of *H. volkartii* is entirely tropical, with records mainly from Rhodesia and Angola.

1. *Huernia hystrix* (Hook.f.) N.E.Br. in Gard. Chron. **5**: 795 (1876).—K. Schum., *Asclepiadaceae* in Engler & Prantl, Pflanzenfam. **4** (2): 280 (1895), "*Heurnia*".—Schlechter in J. Bot. **36**: 485 (1898).—N.E.Br., *Asclepiadaceae* in Thistleton-Dyer, Fl. Cap. **4** (1): 911 (1909).—Berger, Stap. u. Klein.: 172 (1910), "*Heurnia*".—J. M. Wood, Natal Plants **6** (3): t. 556 (1912).—Gomes e Sousa in Moçambique **4**: 45, 47 (1935) et **49**: 61 (1947). "*histryx*".—White & Sloane, Stapelieae, ed. 2, **3**: 892 (1937).—Phillips in Flower Pl. S. Afr. **19**: 757 (1939).—O. West, Veg. Weenen County, Natal: 145 (1948).—Luckhoff, Stap. S. Afr.: 208 (1952).—Jacobsen, Handb. Succ. Pl. **2**: 622 (1960) et Lexicon Succ. Pl.: 274 (1974).—Compton, Checklist Flora Swazil.: 64 (1966).—D. Edwards, Pl. Ecology Survey Tugela R. Basin: (1967).—Plowes in Excelsa **1**: 16, 30 (1971).—Ross, Flora Natal: 292 (1972).

Type: Natal, M'Ken s.n.; Icon.: W. Fitch in Bot. Mag.: t. 5751 (1869).

Stapelia hystrix Hook.f. in Bot. Mag.: t. 5751 (1869).

Type: as above.

Huernia appendiculata Berger, Stap. u. Klein.: 174 (1910), "*Heurnia*".

Type: "S. Africa?". Locality unknown.

Huernia hystrix var. *appendiculata* (Berger) White & Sloane, Stapelieae, ed. 2, **3**: 898 (1937).—Jacobsen, Handb. Succ. Pl. **2**: 622 (1960), et Lexicon Succ. Pl.: 274 (1974).

Type: as above.

Var. *appendiculata* is here considered to be synonymous with the typical variety as from Berger's figure it appears to be based on a more or less normal flower with its corona in the early stages of collapse. The terminal appendages of the inner lobes of the corona depicted are perhaps longer than most, but as the size and shape of these appears to be almost infinitely variable this is not considered to be of any significance. It should perhaps here be explained that in the early stages of the collapse of *huernia* flowers the inner corona-lobes appear to be affected first, in most species becoming more divergent and recurved, sometimes rather sharply so towards the apex (e.g. see Schlechter's sketch of *H. stapelioides*, White

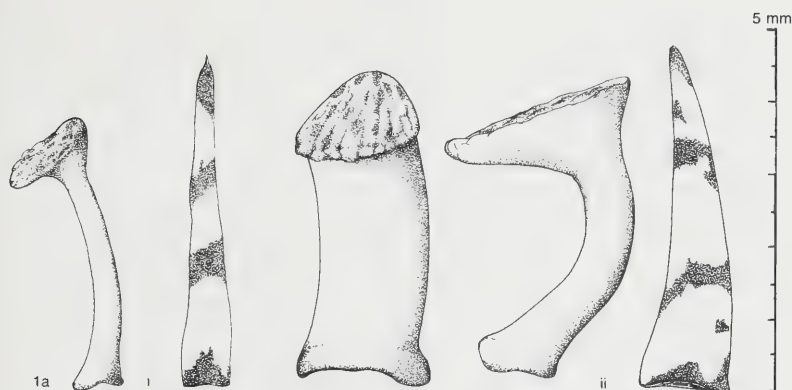


FIG. 3.

1a. *H. hystrix* var. *hystrix*. (i) Fawnleas, Natal, Bayer s.n. (ii) Nelspruit, Transvaal, Leach 14133 (exceptionally large corona-lobe and papilla).

& Sloane *l.c.*). This effect is accentuated in var. *hystrix* by the normally horizontally positioned "foot-like" terminal appendage then becoming vertically arranged with the "heel" erect.

Despite the variability of some of its characters *H. hystrix* is almost always easily distinguished from its immediate relatives by its sprawling rather than tufted habit, its relatively long pedicel (in var. *hystrix* normally at least twice as long as those of *H. stapelioides* and *H. volkartii*), and humifuse flowers.

Two varieties are recognized, of which the typical is by far the more widely distributed, while var. *parvula* appears to be restricted to a relatively small area of south-eastern Natal where var. *hystrix* is not known to occur. The new variety could perhaps, on this account, be considered to qualify for subspecific rank, but in view of the existence of intermediates such as *Codd 5941* from Tugela Ferry, and others, mainly from the northern Transkei, it is considered that varietal status is more appropriate.

It was at first thought that the rather small flowers of Fitch's drawing (Bot. Mag. *l.c.*) might represent this new variety; however, the description and other details of the figure leave no doubt that the generally larger flowered typical variety is depicted. Unfortunately none of the original material has been traced.

a. var. *hystrix*

Chromosome number: $2n = 22$, Reese u. Kressel (1967) and Focke Albers (1975).

RHODESIA—S: Sabi/Lundi Junction, Chitsa's Kraal, *H. Wild 3504* (SRGH); Gona re Zhou Nat. Park, fl. Feb. 1969 (SRGH), *ibid.* cult. Umtali sub *Plowes*

3011, *Broadley s.n.* (PRE), *ibid.* cult. Greendale, sub *Leach 14233*, *Blake 119* (SRGH).

MOÇAMBIQUE—SS: Caniçado, cult. Nelspruit, sub *Leach 12293*, fl. i.1965, *Mockford s.n.* (SRGH).

—LM: Catembe, cult. C.I.C.A., Lourenço Marques, fl. 27.i.1955, *Lemos 65* (LMA); Polana, fl. 21.x.1963, *Balsinhas 622* (LMA), *ibid.* fl. 15.i.1946, *A. de Sousa 236* (PRE); Lourenço Marques, cult. PRE, fl. iv.1937, *F. v.d. Merwe 405* (PRE); $\pm$ 16 km N of Moamba, *Leach & Bayliss 12256* (SRGH), *ibid.* cult. Nelspruit, fl. i.1965, *Leach & Bayliss 12254* (BOL, K, LISC, MO, NBG, PRE, SRGH).

SWAZILAND—2531 (Komatipoort): $\pm$ 15 km N of Bordergate (-DD), fl. 23.xii.1960, *Leach & Bayliss 10604* (PRE, SRGH).

—2631 (Mbabane): $\pm$ 24 km SE of Manzini (Bremersdorp) (-DA), fl. 25.xii.1960, *Leach & Bayliss 10615* (PRE); Mhlatuze Riv. (-DC), *Leach & Bayliss 10630* (SRGH); “bushveld near Stegi, 1000’ ”, cult. Mbabane, fl. xii.1960, *M. Karsten s.n.* (NBG).

—2731 (Louwsberg): Maloma (-BA), cult. Nelspruit sub *Leach 12241*, *G. W. Reynolds s.n.* (BOL, PRE); Ingwavuma Poort (-BB), cult. NBG, fl. 23.i.1963, *H. Hall 2339* (NBG).

S. AFRICA. TRANSVAAL—2229 (Waterpoort): Wyllie’s Poort (-DD), cult. PRE, fl. 4.xii.1954, *Codd 8353* (PRE); north side of Zoutpansberg (-DD), cult. Umtali, various dates, *Plowes 2607* (K, NBG, SRGH).

—2329 (Pietersburg): Bandalier Kop (-BD), cult. & fl. Umtali, 3.ii.1967, *Plowes 2473* (PRE); Kalk Bank (-CB), fl. v.1926, *Farquhar s.n.* (GRA); Pietersburg (-CD), cult. NBG 1520/48, fl. 30.iii.1949, *Kransdorff s.n.* (NBG); Louis Trichardt, cult. PRE, fl. iii.1912, *Gettliffe* (GRA).

—2330 (Tzaneen): Mokeetsi (-CA), cult. Nelspruit, various dates, *Leach 12019* (BOL, BR, MO, LISC, SRGH, ZSS); *ibid.* fl. 21.xii.1932, *Schweickerdt 1051* (PRE), *idem* cult. PRE, fl. xii.1933, *Schweickerdt s.n.* (PRE); between Soekme-kaar & Munnik, *Leach 9836* (SRGH); “Woodbush” (-CC), fl. xii.1907, *Gough 3884* (PRE).

—2430 (Pilgrim’s Rest): Shilovane (-AB), *Junod 4140* (PRE); Burgersfort (-CD), cult. Nelspruit Bot. Gard., fl. 15.iv.1973, *Buitendag 1007* (NBG, PRE).

—2529 (Witbank): Klipspruit/Olifants Riv. Junction (-CA), fl. iii.1947, *Thomalla* in *PRE 43946* (PRE).

—2530 (Lydenburg): $\pm$ 8 km S of Nelspruit (-DB), cult. & fl. Greendale, xii.1975, *Leach 14133* (BOL, K, MO, PRE, SRGH); Nelspruit (-DB), *Rogers 24491* (GRA).

—2531 (Komatipoort): 7 mls S of Pretorius Kop (-AA), cult. PRE, fl. 30.iii.1953, *Codd 6501* (PRE), & fl. ii.1954, *Codd 5923* (PRE); Plaston (-AC), fl. iii.1932, *Holt 218* (PRE); Malelane (-AC), fl. 6.iii.1965, *Leach & Bayliss 12731*, fl. v.1965, *Leach & Jones 12852* (SRGH); Louws Creek (-CB), fl. 3.vii.1914,

- Edwards s.n.* (PRE); Kaapmuiden (-CB), cult. Greendale, *Leach 9814* (SRGH); Barberton (-CC), fl. i.1912, *Thorncroft 11122* (PRE), idem 4253 (SAM). NATAL—2632 (Bela Vista): 5 mls NE of Makane's Drift (-CD), fl. 6.iii.1970, *Ross 2363* (ND, PRE, SRGH). —2731 (Louwsburg): Pongola Poort, cult. Nelspruit, fl. i.1965, *Ward* sub *Leach 12197* (PRE). —2732 (Ubombo): Ingwavuma (-AA), cult. Umtali, fl. 22.xi.1971, *Strey* sub *Plowes 3012* (ND); Makatini Flats, Pongola (-CA), *Strey s.n.*, cult. Umtali sub *Plowes 3013* (SRGH); Makatini Flats, below Ubombo (-CA), cult. NBG, fl. 12.xi.1971, *Wisura 1191* (NBG). —2829 (Harrismith): Mielietuin Siding (-DD), fl. 19.iii.1970, *Strey 9750* (ND). —2830 (Dundee): Blaauwkrantz Riv. Valley (-CC), fl. 19.xi.1943, *Acocks 9912* (ND); "Onverwacht", fl. 11.ii.1945, *Acocks 11226* (PRE); Muden Valley, cult. Johannesburg, *Reynolds 354* (PRE); Weenen, fl. i.1941, *Schelpé* in ND 3322 (ND), fl. 15.iii.1933, *Symons* in Transv. Mus. 31812 (PRE); Muden (-CD), *Bulawayo Mus. 37* (SRGH); Tugela Ferry, *Bulawayo Mus. 13* (SRGH); 2 mls S of Tugela Ferry, fl. 9.iv.1950, *Codd 5941* (PRE). —2831 (Nkandla): Ntambana Valley, 20 mls W of Empageni (-DC), cult. NBG 42/44, fl. 3.iii.1944, *Houting s.n.* (NBG); Umhlatazi Valley, Melmoth Road, 23.vii.1949, *Lawn 884* (ND). —2832 (Mtubatuba): near Mtubatuba (-AC), fl. 1.iv.1948, *Rodin 4222* (PRE). —2930 (Pietermaritzburg): Nottingham (-AC), fl. 15.vii.1940, *Mercer s.n.* (PRE); Wartburg (-BC), fl. 14.viii.1966, *Plowes 2596* (ND), idem cult. Umtali (PRE, SRGH); Inchanga (-DA), *Leach 5406* (SRGH); Umgeni Riv. (-DB), fl. 10.viii.1969, *Strey 8837* (ND); Umlaas Riv., Camperdown (-DC), fl. & fr. 21.x.1910, *Franks* sub *Medley-Wood 11717* (Natal Pl. 6: t. 556) (ND), ibid. fl. 1934, *Reynolds 354A* (PRE). —"Natal": *Medley-Wood 4970*, cult. ND, fl. 4.iii.1891 (ND); *Pillans 25* (GRA). —2931 (Stanger): Kranskop (-AA), cult. Umtali, fl. 26.iv.1975, *Bayer* sub *Plowes 4200* (NBG); Mpisi Riv., Tugela Valley, fl. 3.iii.1962, *Edwards 2732* (PRE). CAPE—3029 (Kokstad): Kokstad (-CB), *Bulawayo Mus. 53* (SRGH); Umzimvubu Riv., E of Mt. Frere (-CC), *Plowes 3271* (SRGH). —3128 (Umtata): Tsitsa Falls (-BD), cult. PRE 4769/5/39, *McLoughlin s.n.* (PRE); Umtata (-DB), cult. PRE 43948, *McLoughlin s.n.* (PRE). —"Transkei" cult. NBG 26/67, 3.iii.1971, *M. Holmes s.n.* (NBG).

Plant: usually rather sprawling with loosely linked stems, sometimes forming quite large patches.

Stems: decumbent-erect, usually $\pm$ 60–70 mm long, 5-angled, sharply sulcate, with the angles strongly tuberculate-dentate, often spiny from the hardened, acute tips of the teeth.

Pedice: terete, tapering slightly towards the apex, (20) 30–50 (60) mm long, usually extended clear of the stems with the flower lying flat on the soil.

Sepals: ovate-acuminate, obtusely keeled, 7–10 mm long, 1,5–2,5 mm wide.

Corolla: subrotate with the limb and lobes abruptly, widely spreading, (30) 35–50 mm diam., buff-coloured to yellowish, scabridulous outside; inside marked with brown-red spots and lines; *papillae* fleshy, subulate, flattened, with or without a minute mucro, up to 3,5–5 (5,5) mm high, usually $\pm$ 1 mm broad at the base; *tube* shallowly pan-shaped, usually less than half as deep as broad, often sparingly asperulous inside towards the base; *lobes* more or less deltate, sometimes wider than long, occasionally shortly attenuate, often recurved (I have not seen any which could be described as long and narrow and suspect that the note by White & Sloane (*l.c.*) may refer to misidentified specimens of *H. stapelioides*).

Corona: *outer lobes* extremely variable in shape and colour, sometimes absent; *inner lobes* erect, dorsiventrally much compressed, strap-like and almost parallel-sided, abruptly horizontally expanded at the apex into a generally more or less inverted foot-shaped appendage, which is glabrous or rarely micro-puberulous; the shape and size of this appendage is almost infinitely variable, although conforming always, albeit sometimes somewhat vaguely, to an inverted foot pattern which may be ovate or obovate, "pointed" or "square-toed", with the "heel" longer than the "toe" or almost entirely lacking, while the upper surface may be flat, pustulate-rugulose or sulcate or sometimes a combination of these; nectarial orifice partially concealed by a rather broad but not very prominent tubercle.

Pollinia: elliptic-oblong, 0,35–0,52 (0,56) $\times$ 0,23–0,32 mm.

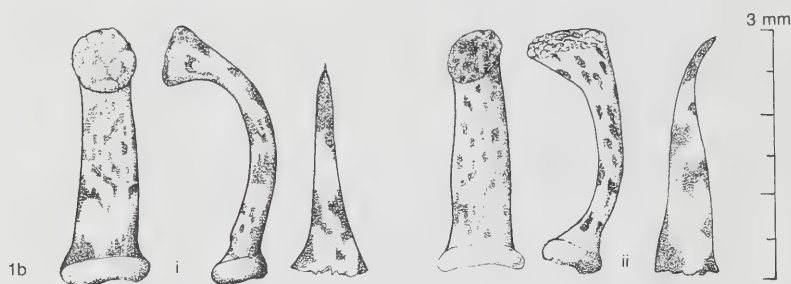


FIG. 4.

1b. *H. hystrix* var. *parvula*. (i) Izingolweni, Natal, *Strey* 6139. (ii) Oribi Flats, Natal, *Strey* 9730.

b. var. *parvula* Leach, var. nov. ab varietate typica differt planta omni minore, caulibus brevissimis; inflorescentia prope basin vel secus caules interdum etiam prope apicem temere exorienti; floribus minoribus, corollae papillis brevioribus et coronae lobis interioribus truncato-clavatis (non valde abrupte plano-ampliatis).

Typus: S. Africa, Natal, Oribi Flats, *R. G. Strey* 9730 (K, MO, PRE, holo., SRGH).

Chromosome number: $2n = 22$, *Lavranos* 7667 (KIEL), Focke Albers (1975).

S. AFRICA. NATAL—3030 (Port Shepstone): Oribi Flats, overlooking Umziikulwana Valley (-CA), 29.vii.1953, *Dyer* 5415 (PRE); Oribi Gorge (-CB), cult. Umtali, fl. i.1974, *Plowes* 2648 (LISC, PRE); 8 km NW of Umtentweni, cult. Umtali, fl. xi.1968, *Plowes* 2645 (BOL; SRGH); Oribi Flats, "Gibraltar" (-CB), *R. G. Strey* 9730, cult. Greendale, sub *Leach* 14464 (K, MO, PRE, SRGH), cult. Umtali, sub *Plowes* 4255 (ND); Izingolweni (-CC), cult. Umtali sub *Plowes* 3136, fl. 10.v.1969, *Strey* 6139 (SRGH).

Stems: 5-angled, seldom more than 30 mm high.

Pedicel: 14–32 mm long, averaging 17.5 mm.

Sepals: 5–8 mm $\times$ 1.25–1.75 mm.

Corolla: closely similar to that of the typical variety but smaller in all its parts, 30–35 mm diam., with papillae usually $\pm$ 2.5 mm high (rarely up to 3 mm); buds more conical than in var. *hystrix*.

Corona: inner lobes rather less strap-like and less abruptly expanded at the truncate-clavate (often obliquely so) apex with a greater tendency to be puberulous and pustulate-rugulose on the upper surface.

Var. *parvula* is quite well distinguished by its smaller stature with very much shorter stems; its variably positioned inflorescence (sometimes near the apex of the stems); its smaller flowers with shorter papillae and rather different inner corona-lobes which are less abruptly expanded at their truncate-clavate apex. It has sometimes been suggested that it should be recognized as specifically distinct from *H. hystrix*; however, in 5-angled stems; relatively long pedicels; "shaggy" flowers with a shallow tube which is sometimes sparingly asperulate inside; relatively long, subulate papillae and glabrous or puberulous, not at all papillose, inner corona-lobes, its overall similarity to *H. hystrix* is such that it can scarcely be considered other than of infraspecific standing and in view of the circumstances previously outlined it is considered that varietal status best reflects the situation.



FIG. 5.

2. *H. stapelioides*. (i) Groblersdal, Transvaal, *Plowes* 4204. (ii) Buffelsvlei, Transvaal, *Leach* 12084. (iii) Hammanskraal, Transvaal, *Plowes* 2609.

2. *Huernia stapelioides* Schlechter in Bot. Jahrb. **20** (Beibl. 51): 55 (1895) et Journ. Bot. **36**: 485 (1898).—N.E.Br., Fl. Cap. **4** (1): 922 (1909).—Berger, Stap. u. Klein.: 167 (1910).—White & Sloane, Stap. ed. 2, **3**: 899 (1937).—Jacobsen, Handb. Succ. Pl. **2**: 629 (1960) et Lexicon Succ. Pl.: 277 (1974).—Compton, Checklist Flora Swazil.: 64 (1966).

Type: Nazareth, between Houtboschberg & Klippdam, *Schlechter 4487* (B[†]).

Huernia vogtsii Phillips in Flower. Pl. S. Afr. **12**: t.452 (1932).—White & Sloane, Stap. ed. 2, **3**: 901 (1937).—Luckhoff, Stap. S. Afr.: 209 (1952).—Jacobsen, Handb. Succ. Pl. **2**: 631 (1960) et Lexikon Succ. Pl.: 277 (1974).

Type: Crocodile Poort, Magaliesberg, *L. R. Vogts* No. 10144 in Nat. Herb. (PRE!), (single flower only).

Chromosome number: $2n = 22$ — Focke Albers (1975).

Although no specimen seen by Schlechter has been traced, it is, in view of the scantiness of material from the area of the type locality, deemed to be advisable to leave the selection of a neotype in abeyance in the hope that more adequately representative material may be obtained from this area.

S. AFRICA. TRANSVAAL—2229 (Waterpoort): Alldays (-CA), cult. Nelspruit sub *Leach 12218*, *Schlieben 9213* (PRE).

—2327 (Ellisras): Ellisras (-DA), cult. Umtali sub *Plowes 3131*, *Haagner s.n.* (PRE).

—2329 (Pietersburg): "Louis Trichardt" (-BB), fl. iv.1911, *Gettliffe 9780* (PRE); 32 km N of Pietersburg (-CB), cult. NBG 1573/48, fl. 14.ii.1949, *Kransdorff s.n.* (NBG); Kalkbank (-CB), *Obermeyer et al.* in Herb. Transv. Mus. 31801 (PRE); Pietersburg (-CD), cult. Nelspruit sub *Leach 12818*, *Strauss s.n.* (SRGH), *ibid. Plowes 1911* (SRGH); Boyne (-DD), cult. Umtali, fl. 29.i.1967, *Plowes 2610* (BOL); 32 km E of Pietersburg (-DD), cult. NBG 510/1954, fl. 29.iii.1956, *H. Hall s.n.* (NBG).

—2428 (Nylstroom): Naboomspruit (-DA), cult. Pretoria, fl. iv.1932, *Schweickhardt* in Herb. Transv. Mus. 30643 (PRE).

—2429 (Zebediela): 9 km S of Pietersburg (-AB), cult. Johannesburg, fl. 12.ii.1936, *Reynolds 1523* (PRE); Naauwpoort (-BC), *Obermeyer et al.* in Herb. Natal 27631 (ND); 5 km E of Chunies Poort (-BC), cult. Johannesburg, fl. 12.ii.1935, *Reynolds 1350* (PRE).

—2430 (Pilgrim's Rest): Brandraai (-BA), cult. Nelspruit, *Leach 12837* (BOL, K, SRGH); Burgersfort (-CB), cult. Umtali sub *Plowes 3592*, fl. ii.1973, *Hardy s.n.* (K, PRE); 24 km W of Steelpoort (-CC), cult. Nelspruit, fl. iii.1964, *Leach &*

Bayliss 12084 (B, BOL, BR, K, PRE), *ibid.* cult. NBG, fl. 16.i.1964, *Bayliss & Leach 1469* (NBG), *ibid.* cult. Nelspruit, fl. 14.ii.1964, *Leach & Bayliss 12086* (SRGH), "Sekukuniland", cult. NBG 529/56, fl. 7.ii.1957, *H. Hall s.n.* (NBG). —2527 (Rustenburg): Crocodile Poort (-DD), cult. PRE, fl. i.1932, *Vogts* in PRE 10144 (PRE).

—2528 (Pretoria): 10 km W of Hammanskraal, cult. Greendale, fl. 6.iii.1960, *Leach 9813* (PRE, SRGH), *ibid.*, fl. xi.1934, *Retief s.n.* (BOL); 6 km W of Hammanskraal, cult. Umtali, *Plowes 2609* (K); 3 km N of Pyramids Stn. (-CA), cult. PRE, fl. ii.1937, *Mogg s.n.* (PRE).

—2529 (Witbank): Groblersdal (-AB), cult. Umtali, fl. 13.ii.1973, *Plowes 4204* (SRGH), *ibid.*, fl. 18.xii.1968, *Plowes 3277* (PRE).

SWAZILAND—2632 (Bela Vista): Ubombo Hills, 16 km from Stegi (-AA), fl. 28.iii.1935, *Keith s.n.* (PRE); $\pm$ 24 km S of Stegi, fl. 28.xii.1960, *Leach & Bayliss 10646* (SRGH); $\pm$ 25 km S of Stegi, cult. NBG, fl. 5.ii.1962, *Compton 28044* (NBG).

Plants forming rather squat compact clumps; *stems* 4/5-angled, stout, usually turgid and almost square (5-angled apparently very rare), with the angles tuberculate dentate, rarely with the tips of the teeth hardened and spine-like.

Pedicel: 7–18, usually $\pm$ 10 mm long.

Sepals: attenuate, obtusely keeled, 8–10 mm $\times$ 1–1.5 mm.

Corolla: buff to yellowish, 30–42 mm across the tips of the widely spreading lobes, somewhat scabridulous outside, inside marked with maroon spots and lines; *papillae* subulate, flattened, up to 2.5 mm long; *tube* smooth inside, bowl or cup-shaped, $\pm$ 1½ times as wide as long; *lobes* deltate-acuminate (sometimes almost deltate-caudate), usually $\pm$ 1½ times as long as broad.

Corona: inner lobes erect, 2.5–3.0 mm long, dorsiventrally compressed, very variably enlarged at the convex, conspicuously "bristly" papillose apex, clavate, ventricose-clavate or, most commonly, shaped somewhat like an inverted foot; nectarial orifice almost concealed by a broad obtuse tubercle.

Pollinia: oblong-elliptic, 0.35–0.5 mm $\times$ 0.25–0.35 mm.

H. stapelioides is occasionally, but somewhat unaccountably confused with *H. hystrix*, from which it is immediately distinguishable by its more compact habit with stout, 4-angled stems (5-angled stems appear to be very rare, I have seen only one such specimen, *Leach 12837* from Brandraai), its very much shorter pedicels, differently proportioned corolla (most evident in bud), with a proportionally longer tube and more acuminate proportionally longer lobes which are covered with shorter, although otherwise similar papillae, and finally and most conclusively by its very different "bristly" papillose inner corona-lobes.

An excellent account of this species by J. F. Kirsten is to be found under *H. vogtsii* in White & Sloane (1937).

3. *Huernia loesenerana* Schlechter in Bot. Jahrb. **20** (Beibl. 51): 55 (1895), et in Journ. Bot. **36**: 485 (1898).—N.E.Br., Fl. Cap. **4** (1): 911 (1909).—Berger, Stap. u. Klein.: 171 (1910).—Phillips in Flower. Pl. S. Afr. **6**: t.216 (1926).—White & Sloane, Stap. ed. 2, **3**: 905 (1937).—Jacobsen, Handb. Succ. Pl. **2**: 624 (1960), et Lexicon Succ. Pl.: 275 (1974), "*loeseneriana*".

Type: S. Africa, Transvaal, near Olifants Riv., $\pm$ 5 000 ft. alt., 20.xi.1893, Schlechter 3774 (B $\dagger$).

Chromosome number $2n = 22$ — G. Reese (1971) & Focke Albers (1974).

Schlechter's type specimen was destroyed in Berlin and neither isotype material nor any other specimen seen by Schlechter is known to exist. However, as with *H. stapelioides*, the selection of a neotype is left in abeyance, as none of the scanty available specimens is considered to be really adequate for this purpose. The holotype from "near Olifant's River" appears to have been collected in the vicinity of Middelburg and the only specimen seen from this locality (*Buys* sub *Plowes* 3283) is an aberrant plant with albino flowers which is consequently considered to be unsuitable for typification purposes.

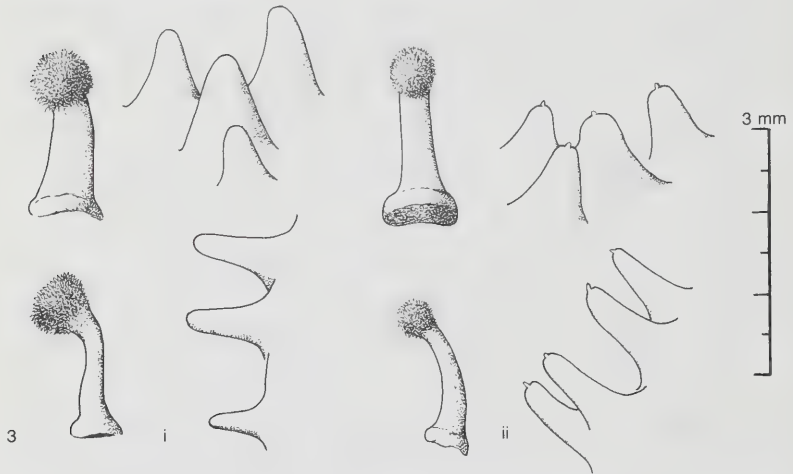


FIG. 6.

3. *H. loesenerana*. (i) Middelburg, Transvaal, *Buys* sub *Plowes* 3283. (ii) Witbank, Transvaal, *Plowes* 2629.

S. AFRICA. TRANSVAAL—2428 (Nylstroom): Warmbaths (-CD), cult. Pretoria, fl. iv. 1912, *Leendertz* 11462 (PRE).

—2527 (Rustenburg): Rustenburg Distr., cult. NBG 492/56, fl. 26.xi.1956, *H. Hall s.n.* (NBG).

- 2528 (Pretoria): Aapies Riv. (-CA), fl. ii.1904, *Bolus 11119* (BOL), *ibid.* fl. 30.ix.1909, *Leendertz 2101* (GRA) et *7210* (PRE); between Riviera & Gezina (-CA), fl. iii.1930, *Nouhuys* sub PRE 8458, (PRE); hilltop, Riviera (-CA), fl. 18.xii.1925, *Smith 1825* (PRE); Sunnyside, Pretoria, fl. x.1913, *Stent* sub PRE 43945 (PRE); Brooklyn, Pretoria, fl. v.1935, *Verdoorn s.n.* (PRE); Brummeria (-CB), *Prins s.n.* (PRE); Irene, kopje E of rly. (-CC), *Obermeyer 442* (PRE).
- 2529 (Witbank): 5 km N of Witbank (-CC), cult. Umtali, fl. vi.x.1968, *Plowes 2629* (K, PRE); near Middelburg (-CD), cult. Umtali, fl. i.1972, "albino", *Buys* sub *Plowes 3283* (SRGH).
- 2530 (Lydenburg): 8 km SE of Waterval Boven (-CB), cult. PRE, fl. 1937, *Reynolds 2155* (PRE); Waterval Boven, cult. GRA, *Britten 4813* (GRA); Waterval Boven Tunnel, fl. 1.iii.1937, *F. v. d. Merwe 1248* (PRE).
- 2627 (Potchefstroom): Sterkfontein Caves (-BA), fl. 25.xii.1969, *Mogg 34666* (J); Magaliesburg (-AB), cult. PRE, fl. 12.iv.1964, sub *Leach 12161* (SRGH).
- 2628 (Johannesburg): Rivonia (-AA), fl. 24.iii.1958, *Lavranos s.n.* (PRE); Kloof, Heidelberg (-AD), cult. Umtali, fl. i.1972, *Plowes 2909* (NBG, PRE).
- ORANGE FREE STATE—2627 (Potchefstroom): Witkop near Parys (-DC), cult. Umtali sub *Plowes 3593*, fl. Jan. 1972, *W. J. Louw s.n.* (SRGH).

Plant tufted; *stems* short (usually less than 6 cm long), stout relative to their length, with 4 acute, dentate angles.

*Pedice*l: 2–10 mm (usually ± 7 mm) long.

Sepals: narrowly ovate-attenuate, 4–7,5 mm $\times \pm 2$ mm.

Corolla: campanulate, 18–26, usually ± 20 mm diam., buff to brownish coloured, scabridulous outside, inside densely marked with brown to dark crimson, broken transverse lines and spots, papillae short, stout, obtusely conical, somewhat widened at the base, up to ± 1 mm long, rarely shortly apiculate; *tube* more or less cup-shaped, widening slightly towards the throat but not at all urceolate, ± 10 mm diam., 7–9 mm long, sparingly asperulous towards the base inside; *lobes* broadly deltate, 5–6,5 mm long, 6,5–9 mm wide at the base, suberectly or sometimes widely spreading, but not abruptly so, intermediate lobes small, $\pm 1,5$ mm long.

Corona: outer lobes somewhat variable, mostly more or less subquadrate, obtuse or subtruncate; inner lobes erect or sometimes connivent-erect, short, usually $\pm 1,75$ mm long, transversely ridged at the base, clavate, minutely papillose at the knob-like apex; nectarial orifice concealed by a prominent tubercle.

Pollinia: oblong-elliptic, 0,4–0,5 mm $\times$ 0,25–0,3 mm.

Schlechter's note regarding the exceptional length of the corolla-tube and its comparison with that of *Tavaresia* is rather mystifying as this is not supported by the available material nor by Schlechter's description in which the length of the whole corolla is given as 1,5 cm.

Although superficially resembling *H. stapelioides* and having a contiguous distribution, this species is easily distinguished therefrom by its proportionally longer more open tube which is asperulous inside towards the base; its proportionally shorter and wider, more or less triangular corolla-lobes which are usually wider than long, and especially by its much shorter obtusely conical papillae and short clavate inner corona-lobes which are usually very knob-like at the apex.

4. *Huernia volkartii* Peitsch. ex Werderm. & Peitsch. in *Gartenflora* **85**: 78 (1936), "*Heurnia*".—R. A. Dyer in *Flower. Pl. Afr.* **38**: t.1519B (1967), p.p. excl. var. *nigeriana*.—Jacobsen, *Lexicon Succ. Pl.*: 277 (1974), p.p. excl. var. *nigeriana*.

Huernia volkartii Peitsch. in *Gartenflora* **85**: 9, 10 (1936) nom. nud.



FIG. 7.

4a. *H. volkartii* var. *volkartii*. (i) Mt. Emberengwa, Belingwe, Rhodesia, *Leach* 14879. (ii) Chimanimani Mtns., Rhodesia, *Plowes* 2598. (iii) Gabela, Angola, *Leach & Cannell* 13951.

4b. *H. volkartii* var. *repens*. Espungabera, Moçambique, *Percy-Lancaster* 74.

Type: Angola, without precise locality, cult. Jena Botanic Gardens.

It appears that no material has survived and the small photograph published by Peitscher is considered to be inadequate for lectotypification purposes.

Huernia volkartii Gossweiler ex White & Sloane, Stap. ed. 2, **3**: 907 (1937.—Jacobsen, Handb. Succ. Pl. **2**: 631 (1960) et Sukk. Lexikon: 245 (1970), p.p. excl. var. *nigeriana*.—Huber, *Asclepiadaceae* in Merxmüller, Prodr. Flora Südwestafrika **114**: 40 (1967).—Plowes in Excelsa **1**: 16 (1971), p.p. maj.

Type: Angola, Cuanza Sul Distr., *Gossweiler s.n.* cult. Pasadena. No specimen preserved.

Huernia montana Kers in Bot. Notis. **122**: 179 (1969).—Jacobsen, Lexicon Succ. Pl.: 275 (1974).

Type: Angola, Serra da Chela, *Kers 3460* (S!).

As all the available Angolan material differs from the original description, particularly in respect of stem characters, it is considered that selection of a neotype should await the availability of material from the area of Vila Nova de Seles, which appears very probably to be the type locality.

The epithet “*volkartii*” was first used by Peitscher in his article “Sukkulente Kleinodien” in *Gartenflora* **85**, in the caption below the photograph of a plant flowering in Jena Botanic Gardens. This plant was brought from Angola by an unnamed German traveller, and it seems that Werdermann’s supposition (Nachtrag zu “Sukkulente Kleinodien” in *Gartenflora* **85**) that the plant was discovered by Gossweiler and that it was provisionally named by him is almost certainly correct. It is quite evident that neither Werdermann nor Peitscher had any knowledge of the origin of the epithet since “the literature was searched and enquiries made”. It also seems noteworthy that although 4-angled stems appear to be rare and possibly restricted to Angola, both the original plants had a proportion of such stems, which seems to suggest the possibility that the two plants were actually of clonal origin from Gossweiler’s original gathering.

Would it be stretching the long arm of coincidence too far to suggest that the doubtful record of this species from Ovamboland (which is suspected possibly of being subject to horticultural recording errors) which came to Pretoria indirectly through the agency of a Mr. Triebner of Windhoek, might also be from the same stock? These specimens also displayed some 4-angled stems, and there is a long history of fanciers and nurserymen in Windhoek, most of whom came originally from Germany and who almost certainly had contacts with similarly interested persons in that country. Similar “tangles” due to cultivated plants are not uncommon in relation to succulent plants and *H. volkartii* is known to have been quite widely distributed among growers in southern Africa.

H. volkartii appears to be most closely related to *H. stapelioides* but differs in its more slender 5-angled stems (4/5-angled in the original description, but

4-angled appear to be very rare) as opposed to the almost universally 4-angled, relatively stout stems of *H. stapelioides*, and in its smaller, more open flowers, with a proportionally wider tube (in this approaching *H. hystrix*) and proportionally shorter, less acuminate corolla-lobes (most evident in bud), while the more obtuse, minutely papillose (less "bristly") inner corona-lobes are generally diagnostically conclusive, especially in dried material.

The two species are ecologically as well as spatially separated, with *H. stapelioides* occupying rather drier habitats, often in shade of thorn scrub and usually at lower altitudes, while *H. volkartii* is usually found on granite or quartzite, often closely associated with *Selaginella*, in areas of relatively high rainfall, and mostly within the mist belt on mountains and escarpments. Their recognition as distinct at specific level is further supported by the available cytological evidence, on which *H. stapelioides* is shown to be diploid while both varieties of *H. volkartii* are tetraploid.

There is considerable variation in the shape and size of the papillae of *H. volkartii*, with a tendency for these to be more conical, or, more rarely, more nearly terete (i.e. less flattened) than in either *H. hystrix* or *H. stapelioides*. While this tendency appears to be rather more prevalent in material from Angola it is by no means restricted to specimens from that country. The flowers of Angolan plants are also generally rather smaller than of those from Rhodesia and Moçambique, but variation in this respect, even in single gatherings, is such that it is probably not of taxonomic significance.

It has been suggested (Plowes, 1971) that plants from the Natal south coast probably belong here, but these are immediately to be distinguished by their much longer pedicels; quite different, not papillose, truncate inner corona-lobes, and a tube which is often asperulate towards the base inside, while although not so clearly diagnostic, there is a tendency for the papillae of the Natal plants to be longer (particularly those towards the margins and apex of the corolla-lobes) than those of *H. volkartii*. All these distinguishing features are characteristic of the extremely variable *H. hystrix* in which the southern Natal plants are considered to belong.

H. nigeriana Lavranos, which was subsequently considered by its author to be of varietal rank in *H. volkartii*, is herein reinstated at specific level and is discussed thereunder.

a. var. volkartii

The typical variety is distinguished by its relatively short, erect or shortly decumbent-erect stems with tuberculate-dentate angles.

Chromosome number: $2n = 44$, Reese (1971).

ANGOLA. CUANZA SUL DISTR.: "Whaleback" ± 11 km E of Gabela, cult. Nelspruit, fl. 24.ii.1968, *Leach & Cannell 13951* (SRGH); granite outcrop ± 15

km W of Quibala, cult. Nelspruit, fl. 24.ii.1968, *Leach & Cannell 13955* (SRGH); "whaleback" $\pm$ 20 km W of Quibala, cult. Johannesburg & Pretoria, fl. 1959–60, *Reynolds 9372* (PRE); the specimen, *N. R. Smuts 1542*, cult. PRE, fl. vii.1959 (PRE), and cult. Nelspruit sub *Leach 12206* (SRGH), is also considered probably to belong here although reputed to be from Pungo Andongo in Malanje Distr. According to a note by Reynolds, some material of the Quibala gathering was given to PRE by Dr. Smuts, for cultivation there and it is suspected that this was erroneously recorded as from Pungo Andongo, which is the type locality for *H. similis* and from where there is no record of *H. volkartii*.

HUILA DISTR.: Humpata, Lubango, Buraco do Bimbe, fl. 22.iv.1960, *Mendes 3770* (LISC); *ibid.*, fl. 22.iv.1960, *Mendes 1487* (LISC); "road to Tundevala, $\pm$ 24 km NW of Sá da Bandeira, fl. 30.iv.1968, *Kers 3460* (S).

SOUTH WEST AFRICA: "Ovamboland" cult. PRE, fl. 30.iii.1951, *Schinz s.n.* comm. *Triebner ex Pienaar* (PRE), *idem* fl. iii.1957 (PRE); "Etosha Pan" cult. PRE; fl. xii.1959—i.1960, collector ? comm. *Venter ex Lavranos* (PRE).

It is suspected that the "Etosha Pan" plant may well have originated from the same clone as the "Ovamboland" specimen and may have been subject to recording errors in cultivation, as it would be most surprising if this montane "mist belt" species of quartzite and granite soils were to occur at these localities.

RHODESIA—E: Vumba Mountain, cult. Umtali sub *Plowes 3996*, fl. ii.1973, *L. C. Walter s.n.* (SRGH); Chimanimani Mtns. "The Corner", cult. Umtali, sub *Plowes 3137*, fl. 14.xii.1972, *O. West 7594* (SRGH); Chimanimani Mtns., Bundi Valley, fl. 10.iv.1967, *Plowes 2598B* (SRGH), *ibid.* cult. Umtali, fl. i.1968, *Plowes 2598A* (K, PRE); Mutema escarp., $\pm$ 48 km SW of Melssetter, fl. 12.xi.1971, *Percy-Lancaster 13* (SRGH), *idem* cult. Umtali sub *Plowes 3876*, fl. 9.ii.1974 (SRGH).

—S: "Shumbari" Mtn., $\pm$ 40 km E of Fort Victoria, cult. Greendale, fl. 4.iv.1957, *Leach 5572* (SRGH), *idem* cult. PRE, fl. 10.i.1958 (PRE); "Fort Victoria" cult. NBG, fl. 6.ii.1958, comm. Bulawayo Mus., 44378 in Herb. Compton (NBG); Belingwe Distr., gorge 3 km S of Mnene Miss., associated with *Selaginella* on decomposing granite, cult. Nelspruit, fl. ii.1966, *Leach & Bullock 12864* (K); *idem* cult. Greendale, fl. 25.i.1972 (SRGH); *ibid.* on granite slope, cult. Nelspruit, fl. iii. 1966, *Leach & Bullock 12863* (PRE); Emberengwa Mtn., mat-forming on steep slopes, banded ironstone, cult. Nelspruit, fl. xii.1965, *Leach & Bullock 12884* (BOL, LISC, MO, SRGH), *idem* cult. Greendale, fl. iii.1966 (K, PRE), *idem* cult. Umtali, fl. ii.1973 (M); NW face, Emberengwa Mtn., robust plants cult. Greendale sub *Leach 14879*, fl. 1973–74, *Bullock 71* (B, BR, NBG, ND, SRGH, Z); Buhwa Mtn., cult. Bulawayo, fl. 24.iii.1968, *et* cult. Umtali sub *Plowes 3321*, fl. 12.xi.1970, *Bullock 189* (SRGH).

Putative hybrid: *H. volkartii* $\times$? *H. hislopiae*. A plant which appears probably to be of this parentage has been collected on Vumba Mtn., on the eastern border of

Rhodesia, cult. Umtali sub *Plowes* 3997, fl. 13.i.1976, L. C. Walter s.n. (SRGH).

Plant tufted or sometimes mat-forming; *stems* erect or decumbent-erect, 5-angled (4-angled appear to be very rare), usually about 4–5 cm high.

*Pedice*l: 5–11 (13,5) mm long.

Sepals: narrowly ovate attenuate, 5,5–7 (8) mm $\times$ 1,25–1,75 mm.

Corolla: campanulate with abruptly, widely spreading lobes, (20) 22–27 (30) mm across the tips of the lobes, cream to brownish coloured, scabridulous outside, inside concentrically lined and marked with dull crimson; *papillae* rather slender, more or less terete or flattened, up to 1,75–2,5 mm long, sometimes shortly apiculate; tube about twice as broad as long, averaging $\pm$ 10 (exceptionally 13,5) mm diam. $\times$ $\pm$ 5 mm deep; *lobes* deltate, usually wider than long 4,5–9 mm long, 7–9,5 mm wide, usually recurved; *intermediate lobes* 2–2,5 mm long.

Corona: outer lobes very variable in both size and shape; inner lobes variably transversely gibbous at the base, minutely papillose at the variably clavate, often somewhat recurved, obtuse apex, sometimes slightly ventricose shortly below the apex on the inner face, then occasionally somewhat “foot-like”; tubercle below the anther wings, subacute, conical, obscuring the orifice.

Pollinia: oblong-elliptic, 0,33–0,45 $\times$ 0,25–0,34 mm.

b. var. *repens* (Lavranos) Lavranos in JI S. Afr. Bot. **38**: 43 (1972)—Jacobsen, Lexicon Succ. Pl.: 278 (1974).

Type: Moçambique, Manica e Sofala, Garuso, cult. Johannesburg, *Schweickerdt* 3469 (PRE, holo.! SRGH!).

Huernia repens Lavranos in JI S. Afr. Bot. **27**: 11 (1961)—Jacobsen, Sukk. Lexikon: 244 (1970)—Plowes in *Excelsa* **1**: 16 (1971).

Type: as above.

Var. *repens* is distinguished by its long creeping stems, of which the angles are usually rounded and the tubercle teeth more or less obsolescent.

Chromosome number: $2n = 44$, G. Reese u. H. Kressel (1971).

RHODESIA—E: Chipinga Distr., Smithfield Farm, $\pm$ 27 km S of Chipinga, 8.iv.1974, *Percy-Lancaster* 112 (SRGH).

—S: Kyle Dam, near Fort Victoria, cult. Umtali, fl. 1967 et 1975, *Plowes* 2483 (SRGH); Mangugwe Mtn., Tokwe-Mukorzi Dam, on granite in mist-belt, cult. Umtali sub *Plowes* 2555, fl. 29.iv.1967, *Buckland* s.n. (SRGH).

MOÇAMBIQUE—MS: NW slopes of Espungabera Mtn., “stems hanging, sometimes up to 1 m long”, fl. 12.x.1973, *Percy-Lancaster* 74 (SRGH), idem cult. Umtali sub *Plowes* 4515, fl. i.1974 (SRGH); Serra de Choa, “28 km de Vila Gouveia”, cult. Sintra, Portugal, fl. 29.viii.1966, *Torre & Correia* 13513 (LISC); Garuso, cult. Johannesburg, fl. 29.xii.1959, *Schweickerdt* 3469 (PRE), fl. 5.v.1960 (PRE, SRGH), idem, cult. PRE, fl. ii.1959 (PRE); ibid. cult. Umtali, fl. 14.ii.1967, *Plowes* 2524 (PRE).



FIG. 8.
Approximate areas of distribution of species of Group II.

GROUP II

5. *Huernia nigeriana* Lavranos in JI S. Afr. Bot. **27**: 233 (1961).

Type: Nigeria, Bauchi, cult. Johannesburg sub *Lavranos 1058* (PRE, holo.!).

Huernia volkartii Gossweiler ex White & Sloane var. *nigeriana* (Lavranos) Lavranos in JI S. Afr. Bot. **30**: 25 (1964)—Jacobsen, Sukk. Lexikon: 245 (1970).

Type: as above.

Huernia volkartii Werderm. & Peitsch., R. A. Dyer in Flower. Pl. Afr. **38**: t. 1519B (1967), p.p. quoad ref. var. *nigeriana*.

Type: as above.

Huernia volkartii Gossweiler, sensu Plowes in Excelsa **1**: 16 (1971), p.p. quoad distrib. Nigeria.

Huernia volkartii Werderm. & Peitsch. var. *nigeriana* (Lavranos) Lavranos, sensu Jacobsen, Lexicon Succ. Pl.: 277 (1974).

Chromosome number: $2n = 22$, Focke Albers (1975).

NIGERIA—48 km W of Bauchi, cult. Johannesburg, 1961, sub *Lavranos 1058* (PRE); ± 5 km S of Jos, cult. PRE, *Reynolds 9623* (PRE, SRGH); Jos, cult. Kumasí, Ghana, *L. E. Newton 518* (SRGH); Pankshin, ± 128 km SE of Jos, cult. Greendale, fl. ii.1973, *L. E. Newton 1194* sub *Leach 14902* (BOL, K, PRE, SRGH). "Plants plentiful among grass and sedge tufts on rocky slope near Pankshin."

Stems: erect or decumbent-ascending, up to 8 cm long $\times \pm 1$ cm, 5-angled, with rather small (up to 2.5 mm high), very acute, spreading teeth along the angles.

Pedicel: 8–10 mm long.

Sepals: usually 3-nerved, acuminate, 6–7 mm $\times$ 1.25–1.75 mm.

Corolla: in bud reminiscent of that of *H. loesenerana*, 20–25 mm across the tips of the lobes, cream-coloured, minutely asperulate outside, sometimes almost smooth, inside marked with blood-red blotches and broken lines; *papillae* rather slender, narrowly conical or subterete, up to ± 1 mm long, sometimes minutely apiculate; *tube* rather deeply cup-shaped, sometimes very slightly urceolate, 9–10 mm diam., 7–9 mm deep; *lobes* spreading, but not abruptly so, usually recurved, deltate, 6.5–7 mm long, 5.5–6.5 mm wide at the base, with a continuous, narrow, dark red, minutely denticulate, papillose margin.

Corona: inner lobes 2.5–3 mm long, incumbent on the anthers, connivent, diverging from about half-way, widened at the base but scarcely gibbous, tapering to a small, minutely papillose, obtuse apex. Nectarial orifice almost obscured by a relatively acute tubercle.

Pollinia: oblong-elliptic, 0.4–0.5 mm $\times$ 0.26–0.3 mm.



FIG. 9.

5. *H. nigeriana*, Jos, Nigeria, Newton 1194. 6. *H. lodarensis*, Lodar, S.W. Arabia, Lavranos 1789.

When Lavranos reduced his species to varietal rank in *H. volkartii* he appears possibly to have been unduly influenced by the apparent overall similarity of the two taxa involved; a similarity which, on critical examination of the material now available, appears to be rather superficial.

In proportionally longer tube, much shorter papillae, subulate inner corolla-lobes, as well as in the continuous, dark red, papillose-denticulate margin of the corolla lobes and very acute stem teeth, *H. nigeriana* is considered to be far more closely related to *H. lodarensis* Lavr., from S.W. Arabia, than to *H. volkartii*. Such a relationship also appears to be more acceptable on distributional grounds than one with the southerly based *H. hystrix* complex to which *H. volkartii* appears definitely to belong; it is also considerably strengthened by the cytological evidence, both northern species being diploid while *H. volkartii* is tetraploid. From this latter *H. nigeriana* is additionally distinguished by its less abruptly spreading corolla-lobes, less scabrid outer surface and generally more robust habit.

6. *Huernia lodarensis* Lavranos in Jl S. Afr. Bot. 27: 233 (1961).—Jacobsen, Lexicon Succ. Pl.: 275 (1974).

Type: S. Arabia, Audhali Sultanate, Lodar, Lavranos 1900 (K, "spirit"!).

This species appears from the records to be known only from the vicinity of Lodar and to be represented in herbaria other than Kew by a single flower only, cult. Umtali sub Plowes 3604, fl. 29.xii.1973, Lavranos 1789 (SRGH).

Stems: stout, 5-angled, with widely spreading, stout, very acute, almost subulate stem teeth.

Pedicel: 8–12 mm long.

Sepals: narrowly attenuate, 1-nerved, 8–10 mm × 1–1.5 mm.

Corolla: ± 36 mm across the tips of the lobes, cream-coloured, outside minutely asperulous, inside marked with purple-brown, often confluent blotches and broken lines; *papillae* stout, subconical, sometimes minutely apiculate; up to 1,5 (1,75) mm high, 0,75 (sometimes almost 1 mm) broad at the base; *tube* campanulate, ± 12 mm diam. $\times$ 7,5 mm deep, sparingly asperulate inside towards the base; *lobes* widely spreading recurved, deltate, shortly very narrowly acuminate, 3-nerved with the central very prominent, 11 mm long, 9–9,5 mm wide, with a continuous, papillose-denticulate, rather frill-like, erect, dark purple-brown margin.

Corona: raised slightly above the base of the tube on a disc-like central platform, with the outer lobes adpressed to the base of the tube only towards their apex; inner lobes ± 3 mm long dorsally flattened and widened towards the weakly transversely gibbous base, tapering to a small, minutely scabrous, obtuse apex.

Pollinia: oblong-elliptic, $\pm 0,4$ mm $\times$ 0,25 mm.

On the presently available evidence it seems probable that all or some of the following characters, or combinations of these, will prove to be diagnostic. Long narrow sepals; short stout papillae; corona raised on a central "platform" and "subulate" inner corona-lobes; of these, those relating to the corona are possibly most important, particularly the peculiar central "platform" which I have not observed in any other species. The characteristic stems and corolla margin may also, if constant, provide at least confirmatory characters; in any event there seems no doubt that *H. lodarensis* is perfectly distinct from any of the related taxa herein discussed.

The stout papillae and subulate inner corona-lobes are both clearly to be seen in the photo by the Botanical Research Institute, Pretoria, JI S. Afr. Bot. 27: fig. 1, Pl. XVI (1961).



FIG. 10.

7. *H. erinacea*, Dandu, Kenya, *Lavranos* sub NBG 237/59. 8. *H. recondita*, Ethiopia, *Gilbert s.n.* sub *Leach* 15562.

7. *Huernia erinacea* Bally in Flower. Pl. Afr. **31**: t.1206 (1956).—Jacobsen, Handb. Succ. Pl. **2**: 621 (1960), et Lexicon Succ. Pl.: 273 (1974).

Type: Kenya, N.F.D., Dandu, *Gillett 12629* (K; PRE!).

Chromosome number: $2n = 44$, Kew (Cyt. 62–363 & 382), and Reese u. Kressel (1967).

KENYA, N.F.D.—Kenya-Ethiopia border, *Bally*, “spirit” 295–58 (K); *ibid.* *Gillett* “spirit” E.N. 330–52 (K); Dandu, $\pm$ 96 km E of Moyale, cult. PRE, fl. 12.v.1952, *Gillett 12629* (PRE); *ibid.* cult. NBG 237/59, fl. 9.ii.1962 & 29.iii.1962, *Lavranos s.n.* (NBG).

Stems: obtusely 5-angled, somewhat obsolescently tubercle-toothed, procumbent, up to 60 mm long $\times$ 10 mm in the material seen.

Pedicel: 7–15 (20 *Bally*) mm long.

Sepals: narrowly ovate, acuminate, 1-nerved, 6 mm $\times$ 1,75 mm.

Corolla: 40–42 mm across the tips of the lobes, yellowish; inside marked with red-brown (blackish purple *Bally*) spots and lines; *papillae* subobtusely conical, relatively crowded, up to 1,5 mm high (0,75 *Bally*), 0,75 mm broad at the base, marked with dark purple; *tube*, shallowly urceolate, 12–15 mm diam., 7–10 mm deep (apparently somewhat variable in depth), smooth inside; *lobes* spreading recurved, narrowly deltate, 8–9 mm wide at the base, 15,5–17,5 mm long (13 $\times$ 20 *Bally*) with a continuous, irregularly denticulate-papillose (some papillae relatively large), dark purple margin.

Corona: inner lobes erect, 3,5 mm long, slightly divergent, blackish purple at the enlarged base, whitish above, minutely purple spotted, more or less terete, tapering slightly to the minutely papillose, obtuse apex (cylindric, smoothly rounded *Bally*).

Related to *H. hystrix* this tetraploid east African species differs significantly in numerous characters. In addition to its generally quite different, obtusely angled procumbent stems, the distinguishing floral characters include its much shorter pedicels and long narrow corolla-lobes (most evident in comparison of buds) with a continuous, denticulate-papillose margin and much shorter papillae which are entirely different in character from those of its southern relative, while the obtuse inner corona-lobes are “*toto caelo*” different. Among east African species it appears, in stem characters, to be closest to the recently described *H. recondita* although otherwise separated therefrom by many of the floral characters by which it differs from *H. hystrix*, and particularly by the entirely different papillae of the Ethiopian species; florally it is, it seems, closest to *H. lodarensis* although easily distinguished from that species by its narrowly triangular corolla lobes.

8. *Huernia recondita* M. G. Gilbert in Cactus Succ. J., Los Ang. **47** (1): 6 (1975).

Type: Ethiopia, *Gilbert 1729* (K, holo.; ADAB; EA).

ETHIOPIA—87 km N of Arba Minch, *M. G. Gilbert s.n.*, cult. Umtali, fl. i. 1976, sub *Plowes 4261* (SRGH), idem sine loc. comm. *Lavranos* cult. SRGH, fl. iii. 1976, sub *Leach 15562* (SRGH).

According to the map supplied by its author, *H. recondita* is restricted to a relatively small area, mainly in Gemu Gofa Govenarate General, in the south-western corner of Ethiopia.

Unfortunately I have not seen the holotype which is preserved in liquid in the herbarium at Kew, and the following notes are based on the above specimens collected by Mr. Gilbert and to some extent on the original description.

Naturally such meagre material gives little idea of any variability possessed by this taxon; one point does however emerge. By far the most distinctive character of this species lies in the extremely slender, very long papillae which attain a length of at least 2.8 mm, although in the original description this measurement is given as 1.8 mm. Since this figure occurs twice in the article concerned it seems improbable that it is an error and that the difference represents a measure of the variability to be found in this character.

Stems: procumbent, obtusely 4-angled (rarely 5–7) with obsolescent tubercle teeth, 7.5 cm long (up to 50), 1–1.25 cm diam.

*Pedice*l: terete, tapering to $\pm$ 1.75 mm diam. at the apex, 17.5 mm long (25–30 mm).

Sepals: ovate acuminate, obscurely 5-nerved, obtusely keeled, $\pm$ 10 mm $\times$ 2 mm.

Corolla: $\pm$ 42 (34) mm across the tips of the lobes, yellowish, densely minutely papillose-asperulate on the outside of the tube, becoming sparsely so on the prominently 3 (5)-nerved lobes, the central nerve exceptionally prominent, inside marked with irregular red blotches and in the tube with transverse lines; *papillae* very slender, cylindric or very slightly expanding to a slightly clavate, obtuse apex, 0.125–0.2 (0.2) mm diam., up to 2.8 (1.8) mm long, red and yellow banded; *tube* campanulate (slightly constricted at the throat), 12.5 (10–11) mm diam., 7.5 (8–9) mm deep; *lobes* deltate, shortly acuminate (acute deltate), 12 (9) mm wide, 15 (12) mm long, with a narrow, dark red, continuous margin, erectly papillose-denticulate above, fleshy, subacute and entire beneath.

Corona: inner lobes $\pm$ 3 mm long, erect, more or less terete, slightly divergent towards the recurved, slightly clavate, horizontally somewhat ovate, minutely asperulate apex, transversely slightly gibbous at the base; anther wings very prominent; nectarial orifice more or less obscured by a rather small tubercle.

Pollinia: oblong-elliptic, $\pm 0.45 \text{ mm} \times 0.28 - 0.3 \text{ mm}$.

Measurements and details in brackets are those of the original description.

While obviously belonging in the *H. hystrix-lodarensis* relationship, *H. recondita* appears to be satisfactorily distinct at specific level on the evidence of several "good" characters in addition to its red buds. Possibly most important are the long, extremely slender papillae, which are quite different from any others I have seen, and the 4-angled, subcylindric, creeping stems. The inner lobes of the corona are also of a different pattern from any of the others, although closest probably to those of *H. volkartii*; however, as very little is known regarding coronal variability in *H. recondita* this should be treated with some reserve in view of the extensive variations to be found in some members of the group. Although 5-angled, there is otherwise considerable similarity in the stem characters of *H. volkartii* var. *repens*.

9. *Huernia boleana* M. G. Gilbert in Cactus Succ. J., Los Ang., **47** (1): 10 (1975).

Type: Ethiopia, Shoa, Bole Valley, M. G. & S. B. Gilbert 2431 (ADAB; K, holo., "spirit").

H. boleana is included here as despite its distinctiveness it appears *ex descr.* to belong in the same overall grouping. Unfortunately I have not yet had the opportunity of examining live or spirit material but rather doubt its suggested close relationship with *H. longituba* of which decidedly papillose, clavate inner coronalobes are so characteristic and corolla shape so variable. In coronal characters this Ethiopian species appears to me to have more in common with some of the northerly based species such as *H. lodarensis* than with the southern groups. Judging from other sections of the group, it seems probable that the character of the papillae might assist in the assessment of possible relationships and from the description it seems possible that these may well belong with those of *H. recondita* and hence that similarities with such species as *H. longituba* are perhaps due to convergence rather than to a more direct relationship.

Stems: 5-angled, strongly toothed, $\pm 1 \text{ cm}$ thick, erect, up to 7 cm high or sometimes pendent.

Pedicel: 5–10 mm long.

Sepals: 6 mm long.

Corolla: $\pm 27 \text{ mm}$ diam., deeply campanulate or tubular, outside smooth, inside pale cream, marked with small red dots; *papillae* slender, cylindric, up to 1.4 mm long, white dotted with red; *tube* $\pm 12 \text{ mm}$ diam.; *lobes* deltate-accumbent, usually longer than wide.

Corona: inner lobes connivent-erect becoming divergent above, $\pm 4 \text{ mm}$ long, subulate, tapering to the minutely obtuse, smooth apex, with a transverse gibbosity at the base; nectarial orifice apparently obscured by a prominent subacute tubercle.

The foregoing details are compiled from the original description and figures as I have not seen a specimen.

GROUP III

10. *Huernia whitesloaneana* Nel in Cactus Succ. J., Los Ang., **8**: 9 (1936).—R. A. Dyer in Flower. Pl. S. Afr. **16**: t.632 (1936).—White & Sloane, Stap. ed. 2, **3**: 1172 (1937).—Luckhoff, Stap. S. Afr.: 196, 206 (1952).—Jacobsen, Handb. Succ. Pl. **2**: 631 (1960), et Lexicon Succ. Pl.: 278 (1974).

Type: S. Africa, Transvaal, Zoutpansberg, *Nel s.n.* in Herb. Stellenbosch 5720 (STE!).

TRANSVAAL—2229 (Waterpoort): Wyllies Poort (-DD), cult. PRE, *Hardy 384* (PRE, SRGH), cult. NBG 843/60, fl. 29.iii. 1962 (NBG); Zoutpansberg, Entabene, *G. Nel s.n.* in Herb. Stellenbosch 5720 (STE), cult. NBG, fl. 26.ii.1957, *A. W. Riley s.n.* (NBG), cult. PRE, fl. iv.1936, *Taylor 2514* (PRE).

—2328 (Maasstrom): Blaauwberg, Mohlakeng Plateau, (-BB), fl. 12.i.1955, *Codd & Dyer 9111* (PRE).

—2329 (Pietersburg): Zoutpansberg, Mountain Inn (-BB), cult. Umtali, fl. 6.xi.1968, *Plowes 2617* (PRE), fl. 9.iii.1974 (SRGH).

Plant: small, tufted, usually less than 5 cm high.

Stems: 4/5-angled, prominently dentate, deeply sulcate.

Pedical: 5 (8) mm long.

Sepals: ovate-acuminate, 5-nerved, the central forming a very prominent obtuse keel, 5–7 mm × 2 mm.

Corolla: campanulate, ± 14 mm diam., 14,5 mm long, outside smooth, purplish mottled; inside irregularly spotted and concentrically lined with purplish red; *papillae* ± conical, occasionally slightly flattened, up to 1,25 mm long, very shortly minutely apiculate; *tube* 8–10 mm long, ± 12 mm diam., smooth inside; *lobes* deltate, ± 6 mm × 6 mm, erect or suberect.

Corona: outer lobes more or less transversely narrowly oblong with the outer margin shallowly incurved, thickened and fused (intergrown) with the base of the tube at its centre; inner lobes subulate, ± 3 mm long, dorsiventrally compressed towards the transversely gibbous base, nearly 1 mm wide, convergent above becoming divergent from about half way, tapering to the small (± 0,2 mm diam.), sometimes very slightly enlarged, obtuse, minutely papillose apex; nectarial orifice partially obscured by a rather prominent obtuse tubercle.

Pollinia: 0,33–0,4 mm × 0,22–0,26 mm.

This very distinctive, small flowered species is restricted, as far as is known, to a small, relatively high rainfall area of the northern Transvaal on the upper slopes of the Zoutpansberg and Blaauwberg.

In corolla shape it seems probably to be closest to *H. loesenerana*, but in other features approaches more closely perhaps to *H. hislopilii*, while the most unusual fusing of the centre portion of the outer margin of the outer corona-lobe with the base of the tube is believed to be peculiar to this species.

11. *Huernia occulta* Leach & Plowes in Jl S. Afr. Bot. **32** (1): 57 (1966).—Jacobsen, Sukk. Lexikon: 276 (1970), et Lexicon Succ. Pl.: 244 (1974).—Plowes in Excelsa **1**: 16 (1971).

Huernia hislopilii sensu White & Sloane, Stap. ed. 2, **3**: 945 (1937), p.p.—sensu Phillips in Flower. Pl. S. Afr. **19**: t.758 (1939).

Type: Rhodesia, near Zimbabwe, *Leach 11661* (K, PRE, SRGH, holo.).

Chromosome number: $2n = 22$, Focke Albers (1974, 1975).

With a scattered distribution on the granite hills of the southern escarpment area of Rhodesia this endemic species appears to be quite rare. However, it seems quite possible that its rarity may be more apparent than real as seemingly eminently suitable habitats abound in this area and it is considered that the relative paucity of records may be due more to its effective concealment among the grass tussocks of its habitat than to its rarity. Although a few gatherings have been made since this species was published these do not represent any significant extension of its distribution as then recorded.

Plants: usually creeping among grasses, then almost or quite completely concealed.

Stems: slender, 5-angled, deeply sulcate.

*Pedice*l: 12–24 mm long.

Sepals: narrowly ovate-acuminate, 6–8 mm $\times$ 1,5 mm.

Corolla: cream-coloured, bicampanulate, with a broad spreading limb about 22,5 mm diam., usually slightly scabridulous outside low down, inside irregularly marked with tawny red blotches; *papillae* short, conical or obtusely conical, up to ± 1 mm high; *tube* more or less cylindric, usually ± 10 mm diam., somewhat variable in length, entirely shining dark purple inside; *lobes* deltate, shortly acuminate, sub-erect or spreading, $\pm$ as long as broad, with a minutely tuberculate margin.

Corona: inner lobes $\pm 3,5$ mm long, subterete, much broadened towards the base, sometimes rather obscurely transversely gibbous, tapering rather sharply to the small, obtuse, sometimes very slightly enlarged, sometimes shortly recurved, minutely obtusely tuberculate or minutely rugulose apex, with their base low down on the staminal column, often almost touching the corona disc; nectarial orifice rather large, partially or completely obscured by a prominent obtuse tubercle.

Pollinia: oblong-elliptic, 0,38–0,4 mm $\times$ 0,26–0,3 mm.

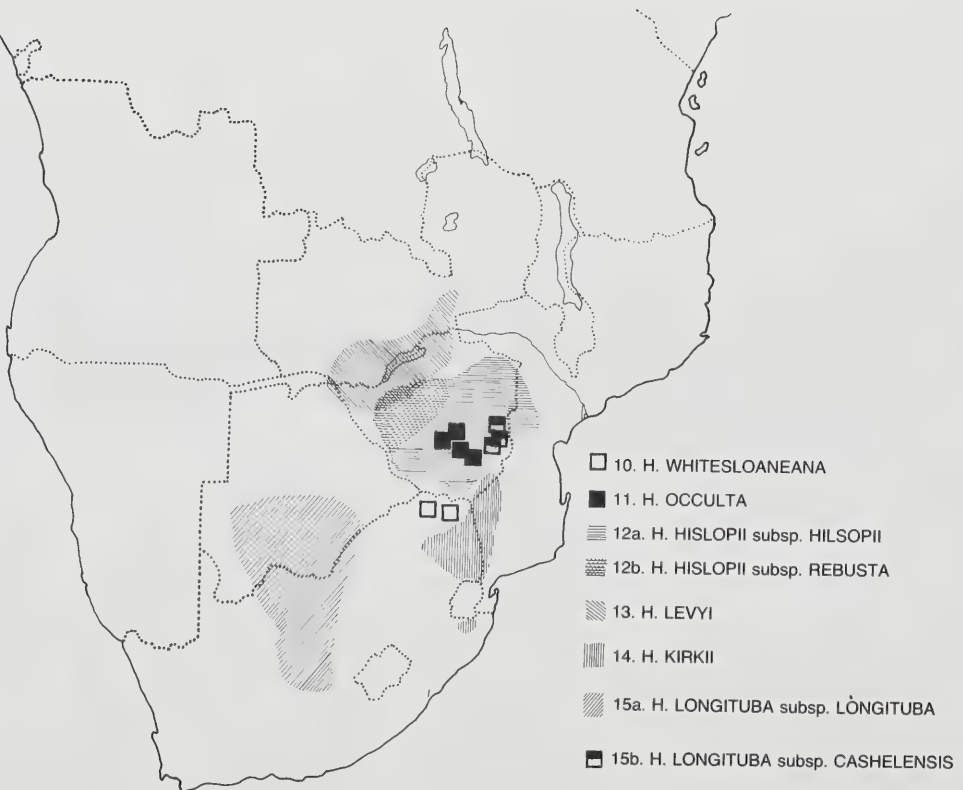


FIG. 11.
Approximate areas of distribution of species of Group III.



FIG. 12.

10. *H. whitesloaneana*, Zoutpansberg, Transvaal, Plowes 2617. 11. *H. occulta*, Zimbabwe, Rhodesia, Leach 11661.

During its early history this handsome species was somewhat unaccountably confused with the frequently associated but quite distinct *H. hislopilii*, which is relatively common in Rhodesia and a small area of Mozambique. Comparisons of the brief descriptions provided will disclose a number of diagnostic characters; of these possibly the most significant is that the inner corona-lobes originate near the base of the staminal column, as opposed to their more usual position near its apex. Apart from the slender, fluted stems the species is, of course, easily recognized also by its handsome bicampanulate flowers with the inside of the more or less cylindric tube shining dark purple in contrast to the concentrically red-lined globose inflated tube of *H. hislopilii*. In bicampanulate flowers, unicoloured tube and corolla markings *H. occulta* approaches *H. kirkii*, but its affinity with that species is considered to be less close than with the frequently closely associated *H. hislopilii*.

12. *Huernia hislopilii* Turrill in Kew Bull. **1922**: 30 (1922).—White & Sloane, Stapelieae ed. 2, **3**: 944 (1937), p.p.—Luckhoff, Stapelieae S. Afr.: 224 (1952), p.p.—Jacobsen, Handb. Succ. Pl. **2**: 622 (1960), p.p. et Lexicon Succ. Pl.: 274 (1974).—Leach & Plowes in Jl S. Afr. Bot. **32** (1): 51–57 (1966).—Plowes in Excelsa **1**: 15 (1971).

Type: Rhodesia, *A. Hislop*, cult. Kew No. 191 (K!).

H. kirkii sensu White & Sloane, tom. cit.: 942 (1937), p.p.—Jacobsen, tom. cit.: 623 (1960), p.p.

H. scabra sensu Markgraf in Trans. Rhod. Sci. Ass. **43**: 128 (1951).

Two subspecies are recognized.

a. subsp. *hislopilii*

Chromosome number: $2n = 22$, Kelly: 189 in Leach (1970); $2n = 33$, $2n = 44$, Reese (1971).



FIG. 13.

12a. *H. hislopil* subsp. *hislopil*, Umtali, Rhodesia, Leach 5698. 12b. *H. hislopil* subsp. *robusta*, Gokwe, Rhodesia, Bingham 874.

The typical subspecies is distributed almost throughout Rhodesia, where it is probably the commonest stapeliad, with an extension into a small area of Moçambique in the Manica e Sofala District, adjacent to the Rhodesian border. Plants occur almost exclusively on the granite hills and outcrops of the main watershed and escarpment areas.

The following recent gatherings slightly extend the known distribution of this taxon.

RHODESIA—N: Bindura, Paradise Pools, cult. Umtali sub *Plowes* 2567, fl. 3.i.1967, *O. West s.n.* (SRGH).

—W: $\pm$ 12 km S of Plumtree, Ingwezi River, cult. Umtali sub *Plowes* 4003, fl. 9.ii.1973, *G. H. Brewer s.n.* (SRGH).

—S: Gona-re-Zhou, Marhumbini Mission, cult. Greendale sub *Leach* 14235, fl. ii.1970, *Blake* 117 (SRGH).

Subsp. *hislopil* has sometimes, in the past, been confused with both *H. kirkii* and *H. occulta*; apart from the fact that both of these bear bicampanulate flowers, subsp. *hislopil* may be immediately recognized by its distinctly concentrically lined and conspicuously globose-inflated tube (in contrast to the unicoloured blackish-maroon tube of both relatives) and additionally from the former by its subulate inner corona-lobes and quite different, much stouter papillae, and from the latter by its much taller corona and relatively stout stems.

Plants: tufted, usually growing along cracks and in crevices on granite rocks, or occasionally forming clumps on deeper soil.

Stems: 5-angled, strongly toothed.

Pedice: 6–20 mm long.

Sepals: narrowly ovate-attenuate, 6–10 mm $\times$ 1,75–2 mm.

Corolla: cream-coloured, smooth outside, 45–57 mm diam.; inside marked with brown-red to maroon blotches on a whitish to creamy ground colour, distinctly transversely red-lined within the tube; *papillae* stout, up to 1 mm high, somewhat compressed and broadened to $\pm$ 0,75 mm near the base, obtuse, usually very shortly mucronate; *tube* $\pm$ 11–15 mm in diam. and length, conspicuously globose-inflated at the base, rather sharply constricted at the throat; *lobes* widely, usually abruptly spreading and often recurved, deltate-acuminate, sometimes almost deltate-caudate, longer than wide, 15–22 mm long $\times$ 12–18 mm wide.

Corona: inner lobes 4–4,5 mm long, transversely gibbous at the base, subulate, at first convergent, becoming divergent from a little below half-way, obtuse at the minutely papillose apex; nectarial orifice almost completely concealed by a scarcely prominent tubercle.

Pollinia: elliptic-oblong, 0,4–0,45 $\times$ 0,28–0,3 mm.

b. subsp. *robusta* Leach & Plowes in Jl S. Afr. Bot. **32** (1): 53 (1966).—Jacobsen, Lexicon Succ. Pl.: 274 (1974).

Type: Rhodesia, Lupani Distr., *Leach 11628* (BM, G, K, LISC, SRGH, holo.).

Chromosome number: $2n = 44$, Focke Albers (1975).

It is this subspecies which has been the more consistently confused with *H. kirkii*, probably on account of its more nearly unicoloured, somewhat less globose tube; however, it is easily distinguished from that bicampanulate flowered species, especially in live specimens, by its 5/7-angled stems, its longer, campanulate corolla with shorter, stouter, minutely mucronate, mottled papillae and its subulate inner corona-lobes which are less prominently papillose and not at all or scarcely enlarged at the obtuse apex (in dry material these sometimes appear to be slightly subclavate due to unequal shrinkage but never to the extent of those of *H. kirkii*).

Subsp. *robusta* is equally easily distinguished from the typical subspecies by its more robust 5/7-angled stems, more or less unicoloured (distinctly transversely lined in subsp. *hislopii*), less globose, longer tube, and proportionally shorter, scarcely acuminate corolla-lobes, as well as by its more robust inner corona-lobes.

Plants occur mainly on sandy or gravelly soils in the thorn bush and *mopane* woodland of western Rhodesia.

The known distribution of this subspecies is slightly extended by the following records of recent gatherings.

RHODESIA—N: Charama plateau, south of Sengwa River, Gokwe Distr., *Simon 407* (SRGH).

—W: near Robins Camp, Wankie Nat. Park, cult. “Ewanrigg”, fl. 23.iii.1973, *Buckland s.n.* (SRGH).

—C: Sebakwe Dam, Que Que, cult. Umtali sub *Plowes 4084*, fl. i. 1973, *Blake 104* (SRGH); “Quetanga”, 24 km E of Que Que, cult. Umtali sub *Plowes 3294*, *D. T. Crow s.n.* (K).

It is interesting to note that the distribution of this subspecies is associated with initially westward flowing tributaries of the Zambesi and not at all with those of the Sabi, Lundi and Limpopo systems.

13. *Huernia levyi* Oberm. in Flower. Pl. S. Afr. **16**: t.616 (1936).—White & Sloane, Stap. ed. 2, **3**: 936 (1937).—Luckhoff, Stap. S. Afr.: 195, 218 (1952).—Jacobsen, Handb. Succ. Pl. **2**: 624 (1960), et Sukk. Lexikon: 243 (1970), et Lexicon Succ. Pl.: 275 (1974).—Plowes in *Excelsa* **1**: 16 (1971).

Type: Rhodesia, Wankie, *B. Levy* in Herb. Transv. Mus. 31142 (PRE!).

Chromosome number: $2n = 22$, Focke Albers (1976).

CAPRIVI STRIP—Mpilila Island, fl. Jan. 1959, *Killick & Leistner 3403* (PRE). ZAMBIA—S: Kafue Nat. Park, Shibatwa Riv., Hort. Plowes., Umtali, fl. Nov. 1967, *Mitchell 3006/3* (SRGH), *ibid.* fl. Feb. 1971; *Mitchell 3006/2* (K, PRE); Namwala, Hort. Leach., Nelspruit, fl. Jan. 1966, *Mitchell 3005* (BOL; SRGH); Livingstone Distr., Songwe Riv. Gorge, Hort. Plowes., Umtali, & SRGH Salisbury, *Mitchell 3013* (K, PRE); Candelabra Pool, Victoria Falls, cult. Greendale, fl. May, 1960, *Leach 9952* (SRGH); Mazabuka Distr., Sikalongo, nr. Choma, cult. Stellenbosch, fl. Mar. 1935 & Dec. 1936, *F. Porter* sub STE 6407 (BOL); Mazabuka, cult. Greendale, fl. Feb. 1960, *Leach 9796* (SRGH) et fl. Feb. 1961, *Leach 10592* (SRGH).

—E: Road to Chipata, $\pm$ 215 km E of Lusaka, cult. Salisbury, fl. 1973–75, *Anton-Smith* sub *Leach 14801* (BOL, BR, K, MO, PRE, SRGH).

—C: “40 mls from Broken Hill” Feb. 1928, comm. *Tapscott* in Herb. Bolus. 31304 and 31305 (BOL).

RHODESIA—W: Wankie, cult. Pretoria, fl. Apr. 1932, *B. Levy* in Herb. Transv. Mus. 31142 (PRE), *idem* in Nat. Herb. 19602 (PRE), *idem*, Hort. van Balen., fl. Feb. 1935 (PRE) cult. Stellenbosch, fl. Jan. 1935, in STE 6468 (BOL); *ibid.* cult. Salisbury, fl. Feb. 1934, *Eyles 8360* (SRGH), fl. Jan. 1936, *Eyles 8532* (SRGH); Inyantui, cult. Greendale, fl. May 1960, *Leach 9974* (BOL, K, SRGH).

—N: Zambesi/Sebungwe Junction, cult. Bulawayo Mus., *M. Paterson 12* (SRGH); Gokwe, fl. Oct. 1963, *Bingham 877* (SRGH); *ibid.*, cult. Salisbury, fl. Nov. 1971, *Kimberley & Pienaar 1* (SRGH); Kariba, Sanyati Riv., cult. Bulawayo Mus., *M. Paterson 129* (PRE); Kariba Gorge, cult. NBG 705/56, fl. Feb. 1957, *Smithers s.n.* (NBG); Kariba Dam, cult. PRE, fl. Dec. 1959, *Hardy* in PRE 13797 (PRE); “Near Kariba”, cult. Greendale, fl. Feb. 1961, *Goldsmith* sub *Leach 10589* (SRGH); Mangula, fl. Dec. 1975, *Percy-Lancaster 141* (K; SRGH).

Plant: stoutly tufted.

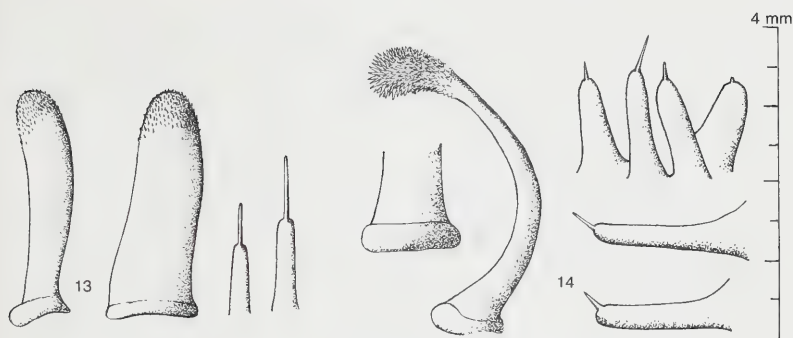


FIG. 14.

13. *H. levyi*, 215 km E of Lusaka, Zambia, Anton-Smith s.n. 14. *H. kirkii*, Mabalane, Moçambique, Leach & Bayliss 11775.

Stems: 4/5-angled, strongly toothed, usually $\pm 2,5$ cm or more thick.

Pedicel: 4–8 mm long.

Sepals: ovate-acuminate, prominently 1-nerved, ± 9 mm $\times$ 2,5 mm.

Corolla: tubular-campanulate, outside brownish, prominently nerved and scabrous, inside dark maroon becoming yellowish on the lobes with dark red blotches; *tube* ± 30 mm long, sparsely minutely asperulate at the lightly excavated basal portion with a densely minutely papillose, raised annulus ± 4 mm above the base, densely papillose above the annulus; *papillae* dark maroon, narrowly elongated conical, obtuse, up to 1,25 mm long, bearing setae $\pm$ as long as the papillae, becoming reduced above and on the lobes and lacking setae; *lobes* suberect to spreading, relatively short, deltate, shortly acuminate, ± 7 –12 mm broad at the base, ± 7 –10 mm long.

Corona: outer lobes much reduced to form a somewhat crenate or almost circular disc; inner lobes erect, stout, somewhat transversely gibbous at the base, dorsiventrally slightly compressed, slightly subclavate seen from the side, ± 3 mm long, 1 mm wide $\times$ 0,6 mm thick, densely minutely tuberculate towards and at the obtuse apex; nectarial orifice obscured by a very broad obtuse tubercle.

Pollinia: elliptic-oblong, 0,46 $\times$ 0,28 mm.

This immediately recognisable species, which has by far the longest tube in the genus, appears probably to be most closely related to those forms of *H. hislopii* subsp. *robusta* which occur in the Gokwe area. In these the tube is dark maroon in colour, with a somewhat similar lightly excavated basal portion, and is usually considerably elongated, while the relatively stout inner corona-lobes are to some extent reminiscent of those of *H. levyi*. However, in most respects the two taxa are obviously different and their correct identification should present no problem.

Recorded only from localities situated more or less along the Zambesi and Kafue valleys, *H. levyi* has a relatively restricted distribution. The most westerly known record is from Mpilila Island in the Caprivi Strip and the most easterly from about 215 km east of Lusaka on the Great East Road in Zambia and at just about the same longitude near Mangula in Rhodesia.

14. *Huernia kirkii* N.E.Br., Fl. Cap. **4** (1): 920 (1909).—Berger, Stap. u. Klein.: 170 (1910).—White & Sloane, Stapelieae ed. 2, **3**: 942 (1937), p.p.—Jacobsen, Handb. Succ. Pl. **2**: 623 (1960), p.p., et Lexicon Succ. Pl.: 274 (1974).—Leach & Plowes in Jl S. Afr. Bot. **32** (1): 43 (1966).—Plowes in Excelsa **1**: 15 (1971).—Non Phillips in Flower. Pl. S. Afr. **12**: t.442 (1932).

Type: S. Africa, Transvaal, Komatipoort, *J. W. C. Kirk s.n.* (K, holo!).

Huernia bicampanulata Verdoorn in Flower. Pl. S. Afr. **12**: t.449 (1932).—White & Sloane, tom. cit.: 941 (1937).—Luckhoff, Stapelieae S. Afr.: 219 (1952).—Jacobsen, tom. cit.: 618 (1960).—Non Bremek. & Oberm. in Ann. Transv. Mus. **16**: 429 (1935).

Type: S. Africa, Transvaal, Pietersburg Distr., *G. van Son s.n.* in Nat. Herb. 10136 (PRE, holo!).

Chromosome number: $2n = 22$, G. Reese (1971).

Some recent records extend the known distribution of this species in the Transvaal and into the south-eastern corner of Rhodesia, where it was not previously known to occur.

RHODESIA—S: Nuanetsi Riv., near the Moçambique border, *Walter* 2897 (SRGH), ibid. cult. Umtali, fl. 25.iv.1969 sub *Plowes* 3293 (SRGH); Clarendon Cliffs, "on sandstone, alt. $\pm$ 1 000 ft.", cult. Umtali sub *Plowes* 2623, 1971–73, *Liversedge s.n.* (BOL, K, PRE, SRGH), idem cult. Ewanrigg (LISC).

S. AFRICA. TRANSVAAL—2429 (Zebediela): Olifants Riv., $\pm$ 45 km E of Bewaarskloof, cult. PRE, 27.x.1970, *Hardy* 3556 (PRE).

—2430 (Pilgrim's Rest): $\pm$ 40 km NW of Burgersfort (-AC), 20.iii.1966, *Leach & Jones* 13255 (BOL, K, LISC, PRE, SRGH); Gravelotte (-BB), *Percy-Lancaster* 130 (SRGH).

Putative hybrid: a specimen collected near Mica (2430 BB), cult. PRE and Nelspruit, appears to be a hybrid with *H. hystrix* the other parent, *Hardy* 925 (PRE, SRGH).

H. kirkii is a low altitude species of rather scattered occurrence; its erstwhile appearance of extreme rarity was due to a large extent to its confusion with *H. hislopiae* and the erection of the synonymous *H. bicampanulata*. However, even now that its identity has been established, the combined records indicate that the species is by no means common.

Plants: tufted, often forming large clumps, solitary or sometimes forming small populations which are very variable as to corolla shape, colour and markings.

Stems: 4/5-angled, strongly toothed.

*Pedice*l: very variable in length from 12 mm to 35 mm.

Sepals: ovate-acuminate, usually prominently keeled, occasionally obtuse beneath, 5–10 mm $\times$ 2–2,5 mm.

Corolla: bicampanulate, 30–50 mm diam., yellowish, outside smooth or sometimes very slightly scabridulous; inside marked with variably sized, red or maroon spots and blotches, unicoloured blackish maroon within the tube; *papillae* up to 2 mm high, unicoloured blackish maroon, more or less conical, usually $\pm$ 0,5 (0,75) mm diam. at the base, obtuse, usually tipped with a short, acute bristle; *tube* smooth inside, rather variable in shape, often more or less pentagonal, sometimes slightly ampliate at the base and slightly constricted at the mouth, usually relatively shallow; *corolla-lobes* deltate-acuminate, wider than long, usually $\pm$ 8–10 mm long $\times$ 11–15 mm wide, erect to erectly spreading.

Corona: inner lobes usually unicoloured blackish maroon, transversely gibbous at the 1,25 mm wide base, somewhat dorsiventrally compressed, at first convergent, becoming divergent from about half-way, tapering slightly to the clavate, densely, acutely papillose apex, $\pm$ 4,5 mm long; nectarial orifice only partially concealed by a relatively small, broadly obtuse tubercle.

Pollinia: oblong-elliptic, 0,4–0,5 mm $\times$ 0,23–0,3 mm.

15. *Huernia longituba* N.E.Br., Flora Cap. **4** (1): 912 (1909).—Berger, Stap. u. Klein.: 171 (1910).—Phillips in Flower. Pl. S. Afr. **10**: t.380 (1930).—White & Sloane, Stapelieae, ed. 2, **3**: 939 (1937).—Luckhoff, Stap. S. Afr.: 218 (1952).—Jacobsen, Handb. Succ. Pl. **2**: 625 (1960) et Lexicon Succ. Pl.: 275 (1974).—Leach & Plowes in Jl S. Afr. Bot. **32** (1): 45 (1966).

Type: S. Africa, Cape Province, near Douglas, *Pillans* 609 (BOL! GRA!).

Huernia bicampanulata sensu Bremek. & Oberm. in Ann. Transv. Mus. **16**: 429 (1935).

In stems, coronal characters and papillae *H. longituba* appears possibly to be most closely related to *H. kirkii* although differing widely therefrom in corolla shape and markings. In these latter there appears to be a link with the otherwise quite different *H. hislopilii*, with the disjunct *H. longituba* subsp. *cashelensis* perhaps to some extent occupying a morphologically slightly intermediate position.

a. subsp. *longituba*

Chromosome number: $2n = 22$, Focke Albers (1975).

With its main distributional area lying in southern Botswana and extending

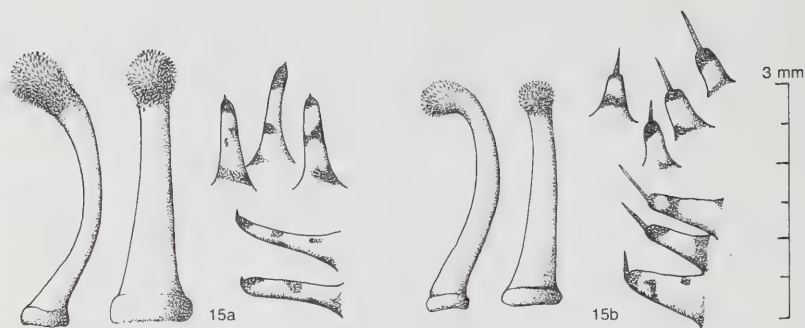


FIG. 15.

15a. *H. longituba* subsp. *longituba*, Matebe, Botswana, Smithers s.n. 15b. *H. longituba* subsp. *cashelensis*, Biriwiri, Rhodesia, Percy-Lancaster 10.

southward through the northern Cape and extreme west of the Transvaal and Orange Free State, the typical subspecies is found generally in semi-desert areas, often in the semi-shade of thorn scrub.

Plants: small, tufted, usually comprising only a few stems.

Stems: 4/5-angled, usually rather angular.

Pedicel: 4–18 mm long.

Sepals: narrowly ovate-acuminate, prominently ribbed, 7–9,5 mm $\times$ 1,5–2,5 mm.

Corolla: tubular-campanulate, very variable in length and breadth, cream-coloured, smooth outside, or occasionally very minutely sparingly scabridulous; inside marked with brown-red to maroon spots and broken transverse lines inside the tube towards the base; *papillae* slender, conical, up to 1,5 mm high, mostly tipped with a minute acute mucro; *tube* smooth with a whitish ground colour within; *lobes* deltate-acute, $\pm$ 8–10 mm long and broad, erectly to widely spreading, or rarely, strongly recurved.

Corona: inner lobes clavate, acutely papillose towards and at the apex, dorsiventrally somewhat compressed, transversely gibbous at the 1 mm wide base; nectarial orifice partially concealed by a scarcely prominent tubercle.

Pollinia: elliptic-oblong, 0,38–0,42 mm $\times$ 0,25–0,27 mm.

b. subsp. *cashelensis* Leach & Plowes in Jl S. Afr. Bot. **32** (1): 49 (1966).—Plowes in Excelsa **1**: 16 (1971).—Jacobsen, Lexicon Succ. Pl.: 275 (1974).

Type: Rhodesia, Cashel, *Leach 5404* (K, PRE, holo., SRGH).

Chromosome number: $2n = 22$, Focke Albers (1975).

Subsp. *cashelensis* differs from the typical subspecies in its 5/6-angled stems, frequently slightly ampliate tube, and most characteristically in its bristle-tipped papillae, with the bristles often as long as the papillae (in this reminiscent of *H. levyi*). This subspecies is extremely variable in corolla length and breadth and particularly in the extent to which the inner corona-lobes are clavate, recurved and apically papillose.

Originally known only from the Cashel-Mutambara area this taxon is now known to be rather more widely distributed; the most northerly record is about 40 km SE of Umtali and the most southerly some 20 km W of Chipinga, near the Tanganda River. The range of habitats is also considerably extended, with plants at the new northern locality growing on granite in *Brachystegia* woodland; on dolerite at Biriwiri and the Tanganda River site, and on the stony gravelly soils of the mixed woodland localities in the Cashel area. Some recent records follow.

RHODESIA—E: "On granite in *Brachystegia* woodland", Chitora Farm, $\pm$ 15 km E of Banti Forest, cult. SRGH, *S. Mavi* 605 (K, PRE, SRGH); "Chitora", $\pm$ 40 km SE of Umtali, cult. Umtali sub *Plowes* 4082, fl. 1.i.1976, *Blake* 69 (SRGH); Mhakwe, Muwushu Res., Melssetter Distr., "on dolerite", cult. Umtali, fl. 26.ix.1968, *Plowes* 2558 (BOL, K, PRE, SRGH); Biriwiri, on dolerite, fl. 30.x.1971, *Percy-Lancaster* 10 (SRGH), *ibid.* cult. Umtali, fl. 12.i.1976, *Plowes* 4227 (NBG, PRE), *ibid.* cult. Salisbury, fl. xi.1971, *Kimberley* 2 (SRGH); $\pm$ 20 km W of Chipinga, "New Years Gift", "on dolerite scree", Tanganda Riv., cult. Umtali, *Plowes* 3120A (LISC, SRGH).

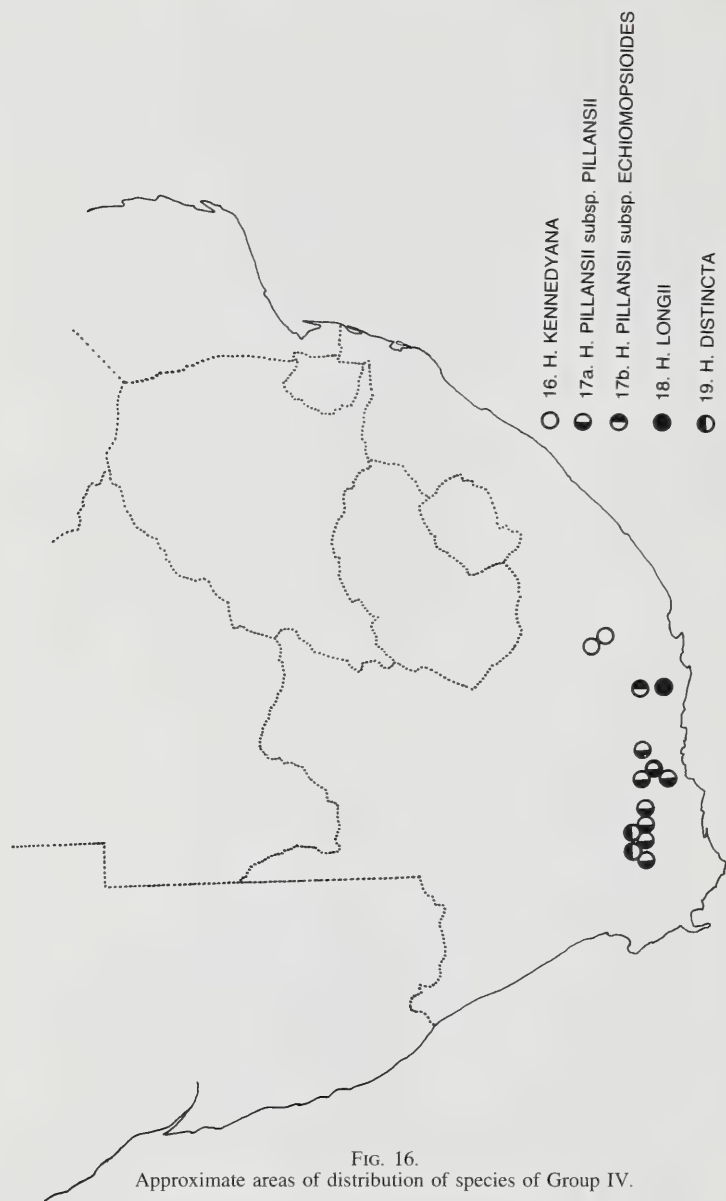
Putative hybrids with *H. verekeri* Stent the other parent are not uncommon in the Cashel and Biriwiri areas.

GROUP IV

The "*pillansii-kennedyana*" group

The taxa included in this most distinctive group of Karoo species are among the most remarkable in the genus and are united mainly by their multi-angular, tessellate, rather than tuberculate stems, those of the well-known typical subspecies of *H. pillansii* providing the most odd example; however, when shorn of their soft bristles by age or other causes, as they sometimes are, these can be seen to be not so very dissimilar from those of subsp. *echidnopsioides*. *H. pillansii* and *H. longii* are obviously the most closely related in floral characters although easily distinguished by their respective coronas; *H. distincta* is considered possibly to be of hybrid origin, with *H. pillansii* one parent, while *H. kennedyana* appears to be the most widely differentiated of the group, with its immediate affinities somewhat less clear.

16. *Huernia kennedyana* Lavranos in Jl S. Afr. Bot. **31**: 313 (1965)—Jacobsen, *Lexicon Succ. Pl.*: 274 (1974).



Type: S. Africa, Cradock, *Kennedy* sub *Lavranos* 2356 (PRE!).
Huernia sp., White & Sloane, *Stapeliaceae*, ed. 2, 1: 60 (1937).

S. AFRICA. CAPE—3225 (Somerset East): “Welbedagt”, $\pm$ 16 km W of Cradock (-AB), comm. *Kennedy*, cult. Johannesburg sub *Lavranos* 2356 (PRE), idem cult. Umtali sub *Plowes* 3275 (SRGH), idem cult. Nelspruit sub *Leach* 12818E (SRGH); Halesowen (-BC), cult. NBG 727/31, fl. iii.1932, *H. W. James* s.n. (BOL), ibid, fl. only, iv.1932, “corolla pale purple” (Pillans), *H. W. James* s.n., in Herb. Bolus, 31303 (BOL), idem stems only, vi.1932, *H. W. James* s.n. (BOL).



FIG. 17.

16. *H. kennedyana*, Cradock, Cape Province, *Kennedy* s.n.

It is surprising that this most distinctive species, which was in cultivation at Kirstenbosch as far back as 1931 and recognised as new by N. S. Pillans when plants flowered early in 1932, should have remained undescribed until 1965. In recent years the species appears to have been known only from the type locality, where plants with cream-coloured flowers with red-brown markings occur. However, among the plants discovered by the late Mr H. W. James, on a mountain top near Halesowen, to the south of Cradock, two distinct colour forms are found: one in which the corolla is pale purple and the other, rather more similar to the typical, in which this is dull yellow with dark purple markings. The “yellow” papillae of both these forms also appear to be somewhat differently coloured from those of specimens from the type locality.

Plants: dwarf, caespitose.

Stems: 6–8 (10)-angled, short, stout, almost globose, tessellate rather than tuberculate.

Pedicel: 4–9 (15) mm long.

Sepals: ovate-acuminate, pusticulate-scabrous, 3–4 mm $\times$ 1.75 mm.

Corolla: 20–22 mm diam., obscurely scabridulous, buff to pinkish cream

outside, inside cream or dull yellow, transversely marked with red-brown or dark purple spots and broken lines or more rarely, wholly pale purple; *papillae* terete, tapering to the obtuse, often subclavate apex, whitish or yellow, up to 2,5 (3) mm long; *tube* campanulate or hemi-spherical, 9–10 mm diam., $\pm$ 5,5 mm deep, sparingly, minutely asperulate inside towards the base; *lobes* deltate, 6–7 mm long, 6–6,5 mm wide with a subcontinuous, erect, papillose margin, 5-nerved with the central very prominent.

Corona: free, not adnate to the base of the tube; inner lobes $\pm$ 2 mm long, subulate, broad and gibbous at the base, dorsiventrally compressed, tapering to the small, minutely papillose, obtuse, sometimes slightly enlarged apex; nectarial orifice obtusely triangular, fully exposed, the accompanying tubercle being very much reduced and somewhat distant or sometimes absent.

Pollinia: oblong-elliptic, $\pm$ 0,39 mm $\times$ 0,3 mm.

Huernia kennedyana may at once be recognised, even when sterile, by its stumpy, almost globose, tessellate stems, and is equally distinctive in its floral characters, of which the unique papillae are perhaps the most striking, while the short subulate inner corona-lobes, which are nearest perhaps to those of *H. longii*, together with the fully accessible nectarial orifice and the extreme reduction of its attendant tubercle are equally diagnostic; the combination of short, broad, scarious sepals and broad, relatively shallow tube which is asperulate towards its base inside is also diagnostically significant.

17. *Huernia pillansii* N.E.Br. in Gard. Chron. **35**: 50 (1904) et Flora Cap. **4** (1): 909 (1909).—Berger, Stap. u. Klein.: 168 (1910).—Marloth, Flora S. Afr. **3** (1): 95, t.22m (1932).—White & Sloane, Stapelieae, ed. 2, **3**: 957 (1937).—R. A. Dyer in Flower. Pl. S. Afr. **22**: t.843 (1942).—Luckhoff, Stapelieae S. Afr.: 223 (1952).—Jacobsen, Handb. Succ. Pl. **2**: 627 (1960) et Lexicon Succ. Pl.: 276 (1974).—Leach in Jl S. Afr. Bot. **34** (3): 140 (1968).

In this well-known Karoo species two subspecies are recognised, these being separated mainly by their vegetative characters.

a. subsp. *pillansii*

Type: S. Africa, Cape, Matjiesfontein, *Pillans* 23 (BOL!, GRA!, K!).

Chromosome number: $2n = 22$, Focke Albers (1975).

Distribution of the typical subspecies lies entirely, as far as is known, between 33°S and 34°S, and extends from near Montagu and Matjiesfontein in the west to near Steytlerville in the east. The main concentration appears to be in the Oudtshoorn District where it is recorded from as far south as Zebra Siding between Oudtshoorn and George.

Stems: more or less cylindric, obtuse or often narrowly ovoid, densely covered with small tubercles with a decurved soft bristle at their apex, usually vertically, or sometimes spirally arranged in 14–24 closely set rows.

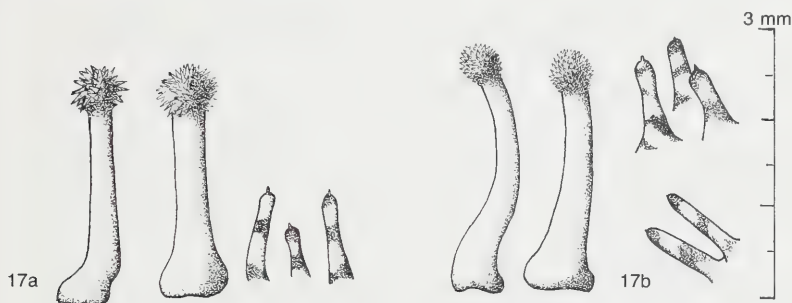


FIG. 18.

17a. *H. pillansii* subsp. *pillansii*, Oudtshoorn, Cape Province, Miss Schnettler s.n.

17b. *H. pillansii* subsp. *echidnopsioides*, Baviaans Kloof, Leach & Bayliss 13612.

Pedicel: 2–8 mm long.

Sepals: narrowly ovate, attenuate, 8.5–12.5 mm × 1–1.25 mm.

Corolla: 36–48 mm diam., yellowish, smooth outside, inside densely papillose and covered in small red spots, the spots arranged in a labyrinthine pattern in the tube; *papillae* cylindric, ± 0.2 mm diam., red banded and tipped, sometimes slightly subclavate, occasionally tipped with a very minute hair, up to ± 1 (very rarely 1.5) mm high; *tube* campanulate, ± 9 mm diam., 7–8.5 mm deep, smooth inside; *lobes* abruptly spreading, narrowly deltate-acuminate, (14) 16–20 mm long, 7–8 mm wide, 3-nerved with the nerves scarcely prominent.

Corona: free, not adnate to the base of the tube; inner lobes erect, often closely connivent or sometimes divergent towards the apex, dorsiventrally compressed and flattened, usually gibbous at the ± 0.75 mm wide base, 2–2.5 mm long, tapering slightly to the very prominently and acutely papillose, clavate, usually knob-like apex; nectarial orifice completely or almost obscured by a prominent tubercle.

Pollinia: elliptic-oblong, 0.33–0.35 mm × 0.23 mm.

b. subsp. *echidnopsioides* Leach in Jl S. Afr. Bot. **34** (3): 140 (1968).—Jacobsen, Lexicon Succ. Pl.: 276 (1974).

Type: S. Africa, Humansdorp Distr., Baviaans Kloof, Leach & Bayliss 13612 (K!, PRE, holo., SRGH!).

Chromosome number: $2n = 22$, Focke Albers (1976).

This subspecies, with a distribution apparently restricted to the eastern end of

Baviaan's Kloof, differs from the typical subspecies in the characters discussed in detail below.

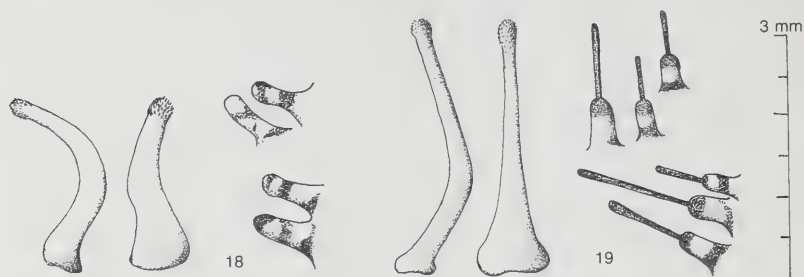


FIG. 19.

18. *H. longii*, cult. specimen. 19. *H. distincta*, Ladismith, Cape Province, Joubert s.n.

Plants: tufted, or sometimes developing a rhizomatose habit.

Stems: usually erect, more or less terete, sometimes tapering very slightly towards the obtuse apex, ± 1 cm diam., up to 16 cm long, with 8–10 (usually 9), vertically, or sometimes somewhat spirally arranged, closely set rows of tessellate tubercles, sharply sulcate between the rows; *tubercles* 1–2 mm high, each tipped with a spreading, usually slightly deflexed, acute tooth (modified leaf) becoming obsolescent with age.

Corolla: similar to that of subsp. *pillansii* but sparingly asperulate towards the base of the tube inside; with proportionally shorter more nearly deltate corolla-lobes ± 7.5 –10 mm long $\times$ 6–8 mm wide.

18. *Huernia longii* Pillans in Jl S. Afr. Bot. **5**: 65 (1939).

Type: S. Africa, Uitenhage Distr., *Long 1154* (BOL!).

S. AFRICA. CAPE—3325 (Port Elizabeth): Groendal (-CD), cult. Port Elizabeth, sub *Pringle s.n.*, fl. iv.1939, *Long 1154* (BOL), and cult. specimens (SRGH).

H. longii is closely related to *H. pillansii* and particularly to subspecies *echidnopsioides* but appears to be satisfactorily separated at specific level by its consistently smaller stature, more slender stems with fewer angles and smaller, spreading (not deflexed) teeth, and an inflorescence of smaller flowers with proportionally wider (usually wider than long) corolla-lobes, shorter papillae and quite different, divergent, subulate, inner corona-lobes which are very minutely papillose at the small, sometimes very slightly enlarged apex.

The habitat of this rare species is entirely different from that of its relative which occurs on Karoo shales, often in fully exposed situations. *H. longii*, on the other hand, grows on very steep, cliff-like, conglomerate slopes, closely intermin-

gled with tufted grasses among shrubs, and associated with *Euphorbia polygona*, *Aloe striata*, *Crassula lycopodioides*, *Haworthia* sp. etc.

Stems: up to ± 8 mm diam., with 6–8 rows of tessellate tubercles, sharply sulcate between the rows and bearing small, spreading, acute teeth (modified leaves) when young.

*Pedice*l: 2–5 mm long.

Sepals: ovate-acuminate, 4–4,5 mm $\times$ 1,25 mm.

Corolla: campanulate, ± 20 mm diam., creamy yellow, smooth outside, inside spotted with crimson, minutely so inside the tube; *papillae* columnar, up to 0,75 mm high, 0,3 mm diam., often tipped with a minute hair; *tube* ± 9 mm diam., ± 7 mm deep, smooth inside; *lobes* spreading deltate, 5–7 mm long and wide, often wider than long.

Corona: inner lobes subulate, 2–2,5 mm long, dorsiventrally compressed and flattened, at first convergent, becoming divergent and recurved above, very slightly enlarged at their minutely papillose apex; nectarial orifice concealed by a prominent subacute tubercle.

Pollinia: elliptic-oblong, 0,38–0,4 mm $\times$ 0,25 mm.

19. *Huernia distincta* N.E.Br., Flora Cap. **4** (1): 910 (1909).—White & Sloane, Stapelieae, ed. 2, **3**: 956 (1937).—Luckhoff, Stapelieae S. Afr.: 222 (1952).—Jacobsen, Handb. Succ. Pl. **2**: 620 (1960) et Lexicon Succ. Pl.: 273 (1974).

Type: S. Africa, Laingsburg, Matjiesfontein, *Pillans* 83 (BOL!; K, holo.!).

S. AFRICA. CAPE—3320 (Montagu): near Whitehill (-AA), fl. xii.1926, *Archer* 270 (BOL), *ibid.* cult. Karoo Gdn., Whitehill. fl. v.1933, *Archer* 630 (BOL); ± 3 km E of Matjiesfontein, cult. “Rosedale” and Kew, 1904, *Pillans* 83 (BOL, K); Laingsburg (-BB), cult. Karoo Gdn., Worcester, sub 391/71, *Conradie s.n.* (PRE). —3321 (Ladismith): “Ladismith Distr.”, cult. Karoo Gdn., Worcester, sub 154/72, *A. J. Joubert s.n.* (PRE).

Stems: 8–9 (mostly 8)-angled, strongly reminiscent of those of *H. pillansii* subsp. *pillansii* but with more strongly toothed, fewer, more prominent angles.

*Pedice*l: 6–12 mm long.

Sepals: ovate-acuminate, very variable in length even in the same flower, 6–12 mm long, 1,5–2 mm wide.

Corolla: 30–36 mm diam., dull yellow, smooth outside; inside densely papillose, marked with red (“crimson”) blotches, and in the tube with broken transverse lines; *papillae* cylindric, obtuse, up to 1 mm high (*Joubert* 0,75 mm), each tipped with a stout, often subclavate, dark red or red-tipped bristle; *tube* campanulate, 12–14 mm diam., 11–12,5 mm long, smooth inside; *lobes* widely spreading, often recurved, deltate-acute, 9–10 mm long, 9–11 mm wide.

Corona: inner lobes slender, subulate, with micro-tuberculate scabrous, very slightly enlarged apices, often scabridulous down to about half their length, somewhat swollen or gibbous at their base, 3–3,5 mm long, at first convergent then diverging from about half-way; nectarial orifice obscured by a rather small tubercle.

Pollinia: oblong-elliptic, 0,38–0,4 mm $\times$ 0,25–0,29 mm.

This species was considered by N. S. Pillans probably to be a hybrid between *H. pillansii* and *H. clavigera* Haw. which both occur in the same area. However, the considerable extent of uniformity to be observed between the initial and subsequent gatherings, together with the repeated occurrence of the species, suggest that it may after all prove to be a "good" species. In any event, whatever its precise ancestry, it seems clear on the evidence of its stems and papillae that it belongs in the "pillansii" relationship, while the corona and the corolla bristles seem to indicate a similarly strong connection with *H. clavigera*.

ACKNOWLEDGEMENTS

I am most grateful to the many friends and colleagues, too numerous to be mentioned individually here, who have contributed to this study in a variety of ways, particularly with many gifts of living plants and other material.

My sincere thanks are also due to the Directors of the: Botanisches Museum, Berlin-Dahlem (B); the Bolus Herbarium, University of Cape Town (BOL); the Herbarium of the Albany Museum, Grahamstown (GRA); the Royal Botanic Gardens, Kew (K); the Centro de Botânica, Lisboa (LISC); the Botanische Staatssammlung, München (M); the National Botanic Gardens, Kirstenbosch (NBG); the Natal Herbarium, Durban (NH); the National Herbarium, Pretoria (PRE); the Herbarium, Swedish Museum of Natural History, Stockholm (S), and the Institut für Systematische Botanik, Zürich (Z), for the facilities of those herbaria which have been visited, for the loan of valuable material, for photocopies of pages from the literature and information concerning type specimens and nomenclatural matters.

REFERENCES

- FOCKE ALBERS, 1974. apud Askell Löve, I.O.P.B. Chromosome Number Reports, No. 44. *Taxon* **23** (2/3): 373–374.
- FOCKE ALBERS, 1975. apud Askell Löve, I.O.P.B. Chromosome Number Report, No. 49. *Taxon* **24** (4): 507–508.
- FOCKE ALBERS, 1976. apud Askell Löve, I.O.P.B. Chromosome Number Report No. 51. *Taxon* **25** (1): 161–163.
- LEACH, L. C., 1970. Stapelieae (Asclepiadaceae) from South Tropical Africa. VI, *Jl S. Afr. Bot.* **36** (3): 157–190.
- PLOWES, D. C. H., 1971. Stapeliads in Rhodesia. *Excelsa* **1**: 7–18.

- REESE, G. and KRESSEL, H., 1967. Untersuchungen über die Chromosomenzahlen der Stapelieae I. *Port. Acta biol. Sér. A* **10** (1/2): 33-54.
- REESE, G., 1971. Untersuchungen über die Chromosomenzahlen der Stapelieae II. *Port. Acta biol. Sér. A* **12** (12): 1-23.
- REESE, G., 1973. The Structure of the highly specialized Carrion-flowers of Stapeliads. *Cactus Succ. J., Los Ang.* **45** (1): 18-29.